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AMERICAN ANTIQUITY

VOL. XV JULY, 1949 NO. 1

PALMATE STONES AND THIN STONE HEADS: SUGGESTIONS ON THEIR POSSIBLE USE

GORDON F. EKHOLM

FOLLOWING my attempt at an explanation of the function or use of Mexican stone yokes[1] I was led on to consider, in a similar vein, two other classes of well known stone objects also common to the eastern coastal regions of Mexico, namely, the *palmas* or palmate stones and the thin stone heads, also known as *hachas*. Both of these groups of objects include some of the finest stone carvings known from the ancient cultures of Mexico, but their curious forms and possible functions have never been satisfactorily explained. Hints or suggestions as to how they may have been used appear to be singularly rare. Those I have been able to gather are equivocal enough and far from conclusive, but I believe they are worth reviewing at the present time as a beginning toward investigation of the problems involved. It is my belief also that any success we may have in explaining the uses of objects of these kinds has a value beyond that of mere antiquarian satisfaction: it affords or may afford some degree of insight into the complex ceremonial functioning of those more advanced but purely archaeological Mexican cultures which preceded the period of the codices and the historical sources.

With few exceptions palmate stones are limited in distribution to the area of central Vera Cruz and adjoining portions of the State of Puebla, while the thin stone heads have been found in greater numbers over a much larger area, extending from Tampico on the north to El Salvador and Honduras on the south. Both are commonly referred to as of Totonac origin, but such an identification means only that they have been found in greatest numbers in the area occupied by the Totonac at the time of the Spanish Conquest. We have little direct evidence enabling us to place them chronologically, but the style of carving indicates that they belong to the Classic horizon—that of developed Teotihuacan and Old Empire Maya. The symbolism of the carvings presents further problems of interest and importance, but these will be largely disregarded in this paper. My concern here is limited to a possible explanation of the curious forms of the objects and the manner in which they may have been used.

[1] Ekholm, 1946.

PALMATE STONES

To begin with the palmate stones, the one illustrated in Figure 1, *b*, will serve to identify them as a class. They show great variation in shape and size, ranging from tall, graceful forms to squat, rounded ones, the latter usually being representations of human or animal heads. A common motif is that of a turkey or other bird, while the finest of all, perhaps, are those bearing a human figure in high relief.[2] In spite of this variety, however, there is one feature common to all *palmas*, the concave base that is well shown in the *palma* illustrated. And it is primarily this curious form of the base or under surface on which a *palma* must stand that raises the question of how they may have been used. While the *palma* shown happens to stand upright when placed on a flat surface, not all of them do so, some tending to fall backward and others forward, indicating that they were de-

[2] Palmate stones have been extensively illustrated: e.g., Keleman, 1943, Vol. 2, Pl. 67; Fewkes, 1907, Pls. 116–19; Anonymous, 1934, pp. 105–7, 112, 114–16; Lombardo Toledano, 1931, Figs. 25–35, 37, 38.

FIG. 1. Two palmate stones and a thin stone head: *a*, palmate stone, private collection; *b*, palmate stone, American Museum of Natural History, height 17 inches; *c*, thin stone head, American Museum of Natural History, on loan from Mr. E. Erickson, height 14½ inches.

signed to rest on some kind of curved or angular surface. The carvings reveal without question that they were meant to be oriented in this upright position.

The discovery which gave form to my search and led eventually to this discussion of the possible function of palmate stones was made on two of the relief carvings on the walls of the large ball court at Tajín, the great and important site near Papantla, Vera Cruz. These reliefs have been described and illustrated by E. S. Spinden,[3] and it is from her published drawings that Figures 2 and 3 have been copied, with emphasis on certain parts of the drawings for present purposes. A photographic reproduction of one of these reliefs has been published by Kelemen,[4] and copies by other artists, seemingly more accurate in some respects than Spinden's, have been published in Mexico.[5]

[3] Spinden, 1933.
[4] Kelemen, 1943, Vol. 2, Pl. 63, *a*.
[5] Anonymous, 1946, Figs. 40, 42.

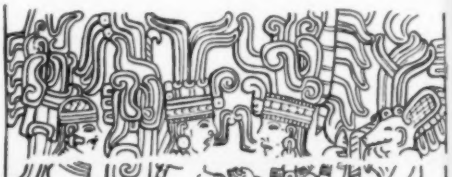

FIG. 2. Relief carving on wall of large ball court, Tajín, Vera Cruz.

Shown in these two reliefs are eight human figures performing ceremonial rites, one of the

individuals being the object of sacrifice. Five of the figures are of interest to us here in having, as a part of their ceremonial equipment, certain curious elongated objects projecting upward at an angle from the front center of the large belts encircling their waists. These objects appear to be *palmas*, for, in profile, they are identical in form to the actual stone *palma* shown in Figure 1, *b*. There is the convexity of the back surface adjacent to the body of the person wearing it; the front surface has a double curve exactly as in the actual *palma*, and there is the concavity on the under surface where the object rests on a thick rounded belt. This close similarity in complex form between the kind of *palma* illustrated in Figure 1, *b* and the objects shown being worn by the figures in the Tajín reliefs can hardly be coincidental and leaves little doubt that there is some relationship between the two.

It would seem, then, that we have in the relief carvings at Tajín an illustration of palmate stones, or at least objects similar in form and in use, and the question immediately arises: can palmate stones be explained as objects of ceremonial import used by resting them upon a thick belt and thus carrying them in front of the body? I am presenting this as an hypothesis and will proceed to examine it from various points of view.

The suggestion that *palmas* were used ceremonially in this way would seem to be in conformity with several of their often noted characteristics. The quality and elaborate design of most examples indicate that they must have been ceremonial objects. The finer ones are exquisitely made and are always completely finished, even on the base, suggesting that they were intended to be carried or to rest in a protected position. Sculptured in relatively soft and brittle stone, often with very thin and easily broken edges, *palmas* must be handled with great care and it is difficult to conceive of their having had any utilitarian purpose. Lacking any other tenable explanation of their purpose, it has been suggested that they were architectural ornaments, but there is no direct proof for such use, nor do they appear to be of such character. They do not have the tenons usually found on architectural ornaments, by which they could have been attached to a building, nor do any of them ever show traces of building or finishing plaster to be expected on objects of such a kind. Furthermore, they are far more delicate in execution than such ornaments are likely to be.

Another factor favoring the explanation suggested here is that the most important decoration of the *palmas* is always on what would be the front side if they are oriented in the manner indicated in the Tajín carvings. Many *palmas* are ornamented on the back as well as the front, but such an elaboration of surfaces not directly visible was common in Mexican art. The curved under surface of the base is the only portion never decorated.

Most important, perhaps, is that this explanation provides a purpose for the curved base

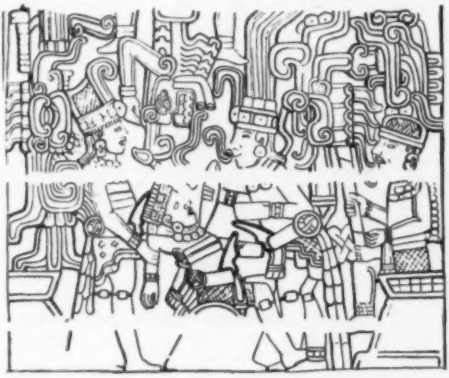

FIG. 3. Relief carving on wall of large ball court, Tajín, Vera Cruz.

common to all palmate stones and for which no explanation has ever been offered. It is impossible to determine the nature of the belts that are shown supporting the *palmas* in the Tajín carvings, but they are thick and rounded in form. We know that large belts of various kinds were worn in the ball game and even that stone yokes were worn as belts, so it is not unexpected to find belts of a size large enough to accommodate palmate stones. I am not suggesting that the Tajín figures are wearing stone yokes or that *palmas* were designed to rest on stone yokes, although that may possibly have occurred somewhere in the Vera Cruz area where the use of *palmas* and stone yokes certainly overlapped. It appears that various kinds of belts were especially important items of ceremonial equipment in the Vera Cruz region and in portions of the Maya area to the south.

They were used in the ball game; they evolved into the stone belt or yoke which would seem to have been largely of ceremonial import; and, if we are correct here, belts of one kind or another were resting places for the elaborate palmate stones.

The curious palmate stone shown in Figure 4,[6] from the collection of Miguel Covarrubias, is of considerable interest in the light of this hypothesis. If a palmate stone is placed on a belt in the manner suggested above, the arms and hands of the individual carrying it can be made to fit in front of the stone in the position shown in the carving. This may be entirely

FIG. 4. Palmate stone in the Covarrubias Collection.

coincidental, but it seems to me more likely that the design of this *palma* was inspired by *palmas* having been worn in the way we are suggesting. This corroborates to some extent the evidence of the Tajín carvings.

If the objects worn on the belts in the Tajín carvings were palmate stones, they certainly could not have rested by themselves in the position shown but would have had to be either tied in place or held by the hands. This seeming inconsistency might be explained by assuming that the artist used a certain amount of license in composing his figures and did not attempt to show how the stones were held in place. It is, of course, difficult to decide just how much "license" one should allow for in cases of this kind. The drawing of the figures appears to be quite realistic, although there are certain elements, such as the being descending from above in Figure 2, which indicate that, to a large extent, an abstract or imaginative scene is represented. As in most cases of this kind, however, the representation of the details of clothing and equipment appears to be done realistically.

It is more probable, in my opinion, that the objects shown in the relief carvings were not actual stone *palmas*, but objects of similar shape made of wood. It is quite likely that *palmas* were carved in wood as well as in stone, or that they were originally made of wood and only later carved in stone. It is also possible that wooden prototypes had some actual function when worn on the belt and that the elaborate stone *palmas* were largely just a conventionalized form, purely ceremonial or decorative, and that the functional form was retained even after the function ceased to exist. There are, for instance, some extremely heavy *palmas* (one in the Covarrubias collection weighs 51¼ pounds), and I do not believe that these were necessarily carried in the way I am suggesting here. Perhaps they were made to be set on a platform like any more conventional "idol" and were made in this form only because it had a symbolic or sacred meaning. In other words, it seems more likely than not that the *palma* "idea" went through a long history of change and adaptation, and we must keep in mind that our hypothesis may apply to only one phase of that history.

Several possible objections to the hypothesis, based on the palmate stones themselves, must be mentioned. Certain *palmas* are so long that they would obstruct the wearer's view when resting vertically on a belt. A very tall *palma* in the American Museum of Natural History measures 32 inches in height. One might expect also that the rear portion of the curved base might have been made longer so that it would fit behind the belt and help support the *palma*. Further, it might be expected that there would be perforations in the upper portions of palmate stones so that they could be tied to the body. Perforations as a result of deep carving are present in some *palmas*, but absent in most.

These are all factors to be taken into consideration, but to my mind they do not necessarily invalidate the hypothesis. There are always certain limiting factors controlling the development of ceremonial objects, but such objects are seldom adapted in an objectively functional way to a specific purpose. Their form or weight or ornamentation may be due more to historical accident than to functional practicality; in any event, they are usually highly conventionalized. The objections, for instance, that some *palmas*

[6] For photograph, see Covarrubias, 1946, Pl. 16.

are so tall that they would obstruct the vision of a person holding one in front of him, or that others are too heavy to be carried comfortably, are not very serious arguments against their having been used in this way. Religious belief and ceremonial activity in ancient Mexico were harsh masters. Certainly the great expenditures of effort and resources devoted to the building of temples and to religious art is proof that minor considerations of comfort or convenience could not obstruct the tendency toward a continual elaboration and perfection of ceremonial-religious activity.

It should be mentioned, perhaps, that the kind of *palma* shown in Figure 1, *b*, and apparently represented in the Tajín reliefs, cannot be called typical because of the great variation of design in these objects. On the other hand, this type of *palma* with the double concavity on the front surface is not a particularly rare variety. A cursory survey of the known *palmas* shows that there are two in the collections of the American Museum of Natural History and one in the Mexican National Museum; another is illustrated by Strebel,[7] and one, supposedly from Papantla, is illustrated by Batres.[8] In any event we must assume—if our hypothesis is correct—that this type of *palma* was in use at Tajín when these particular reliefs were carved.

Note must also be made of that curious type of figurine found in apparent abundance in the central Totonac area in which there is an elongated projection extending outward and upward from the waist or from a belt. A number of these have been published by Lombardo Toledano[9] who, incorrectly, I believe, considers them to be phallic representations. Mrs. Spinden noted their resemblance to the objects on the belts in the Tajín carvings, and it would seem very likely that they were meant to represent the same thing. In all of the figurines illustrated, however, and of those in the large collection in the Museo Nacional, there is in no case any approximation of the form of a palmate stone. This may be due, of course, to the relative crudity of these figurines where the delineation of such details cannot be expected.

Another point of interest is that in some of the figurines mentioned above one of the hands appears to be gloved, suggesting that ball players are represented. The same is indicated for the Tajín reliefs since they decorate the walls of a ball court, and a ceremony seemingly related to ball playing is represented. This suggests the possibility that these projections from the belt and the palmate stones themselves may have been involved in the playing of the ball game, though how that may have been is completely obscure at the present time.

Although not entirely comparable, the carrying of *palmas* in front of the body resembles the Maya use of the ceremonial bar. As observed on a number of stelae of the Initial Series period, the ceremonial bar was apparently a carved object held across the chest. We do not know of what material the bars were made, but, since none of them have been found archaeologically, it might be supposed that they were of wood or some other perishable substance. It does appear in the case of several stelae that they may have been made in part of basketry. The point, however, is only that the Maya had a ceremonial object which was carried in front of the body, and that in essence this is the same idea we have found indicated for the palmate stones.

THIN STONE HEADS

Turning now to a consideration of the thin stone heads, I must proceed, as I did with the *palmas*, without attempting to describe in detail the nature and the variation in form of the many examples that exist in museum and private collections. The fine pieces shown in Figures 1, *c* and 5 will serve to identify them as a

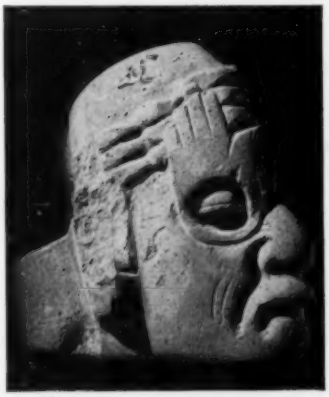

FIG. 5. Thin stone head, Oaxaca Museum, photo courtesy of Miguel Covarrubias.

[7] Strebel, 1885–89, Vol. 1, Pl. XV, *3*.
[8] Batres, 1905, Pl. 12.
[9] Lombardo Toledano, 1931, Figs. 52–4.

class, but many other examples can be examined in the illustrations of any of the books dealing with Middle American art.[10]

As the name used here implies, the principal identifying characteristic of these sculptures is that they are as if laterally compressed, a human head of life-size or over, when seen from the side, being usually about 2 inches in thickness from ear to ear. The maximum thickness of the head shown in Figure 1, *c* is just 2.5 inches. Because of this relative thinness and because the upper and front portions often come to a sharp edge, they have been commonly known as *hachas* (axes) or *hachas votivas* (votive axes). I feel certain, however, that their resemblance to axes is only coincidental and that any term indicating such a relationship is inaccurate and should be abandoned. In a recent paper Thompson has used the term "flat stone head,"[11] but I believe that "thin stone head" is perhaps slightly more descriptive. Neither designation is entirely satisfactory, however, for these sculptures do not always represent heads, a number of pieces depicting full human figures in various poses. A better term is desirable, although I do not have one to suggest at the present time.

It is obvious that many thin stone heads were meant to be attached to some more or less vertical surface, for they have a short but very definite horizontally projecting tenon on the back. One of these heads from the museum in the City of Oaxaca, shown in Figure 5, is a good example of the type.[12] Another class has, instead of a tenon, a more or less right-angled notch on the back side: this is well illustrated in Figure 1, *c*. A third type, confined principally to southern Guatemala, possesses neither of these features, and it is impossible to say whether or not such stones were intended for attachment in the same manner as the others. An evolutionary sequence may be represented in the manner of attachment or in the mode of use of these three types of thin stone heads, but we have so few chronological data that speculation on this point cannot be attempted at the present time.

Before entering into discussion of these several types and the possible function of the differing back surfaces, it is perhaps well to examine the one definite and good bit of evidence in existence which seems to indicate clearly how the thin stone heads may have been used. This is the small clay figurine from Los Tuxtlas shown in Figure 6, a drawing made from the photograph published by Seler-Sachs.[13] As was

FIG. 6. Clay figurine from Los Tuxtlas, Vera Cruz.

stated by Mrs. Seler, the head shown projecting outward from the front of the figure is obviously a thin stone head, and it is clearly attached to a heavy belt. Unfortunately, the original photograph published by Seler, and probably the figurine itself, is not sufficiently well defined to show the exact nature of the belt, but it is similar in form to certain of the belts discussed in my article on the use of stone yokes.[14]

On the basis of this single figurine, let us postulate that the thin stone heads were, in at least one period of their history, meant to be fastened to a belt and worn thus as a piece of ceremonial equipment. For this to be possible we must assume, I believe, that belts of wood or perhaps of leather or basketry were used, for no stone belt or yoke has been found which has any hollows into which another object could have been tenoned. If a wooden belt were used, however, it is readily understandable how a

[10] E.g., Kelemen, 1943, Vol. 2, Pl. 66; Anonymous, 1934, pp. 108, 109, 117, 120, 124, 126; Seler, 1902–23, Vol. 5, pp. 553–6, Pls. 75–6.

[11] Thompson, 1941.

[12] Illustration of this particular specimen was chosen in the interest of making it better known to archaeologists specializing in the southeastern United States area. The hand placed on the eye is similar and probably related to the well known eye-in-hand motif of the so-called Southern Cult in that area. Another Mexican occurrence of the concept is to be seen on the stone model of a wooden drum of Aztec origin in the National Museum of Anthropology of Mexico (see Kelemen, 1943, Pl. 292, *a*).

[13] Seler-Sachs, 1922, Pl. X, *31*.

[14] Ekholm, 1946.

thin stone head with a tenon could have been attached to it.

How then were the thin stone heads with a notch on the rear surface attached? It must be mentioned first that the notch on heads of this type relates them in a certain way to the *palmas*. In fact, there is an almost complete gradation between the two types of sculptures, ranging through various kinds of rounded stone heads that have notches on the back similar to those on the thin stone heads. It seems possible, therefore, that certain of the thin stone heads might have been carried on a belt in the same manner as has been postulated for the *palmas*.

The thin stone head shown in Figure 1, *c*, however, shows definite traces of having been attached to some object. It was attached and then painted red, for the entire head, except the narrow portion around the notch on both sides, is colored. This painted area ends in a sharp line which, because it does not show as clearly in the photograph as it does on the stone itself, has been emphasized by a broken line. Of great interest is the fact that the line forms an approximately right angle at the top and curves outward at the bottom, resembling in form a cross section of a stone yoke or, supposedly, a somewhat larger but similar yoke made of wood. There is some evidence, therefore, that this stone may have been fastened to a wooden belt in the same position as that shown in the figurine from Los Tuxtlas.

At first glance the presence of a notch on the back of a stone sculpture seems ill-suited as a means of attaching it to something in the form of a wooden yoke, but actually it would be an extremely practical technique. A notch in the back of the stone would allow as broad a vertical purchase area as possible without unduly weakening the wooden belt.

Several other good examples of sculptured heads supported on a belt and projecting forward in front of a figure are known, but since they are executed in profile there is less certainty that thin stone heads are represented than in the case of the clay figurine just cited. The best of these is the sculptured fragment from Finca Arevalo (Kaminaljuyu), illustrated by Lothrop[15] and reproduced here in Figure 7 as a drawing taken from Lothrop's photograph. Here we see the waist and legs of a standing figure wearing a broad but apparently flat belt which supports a sculptured head in front of the body. This I would judge to be a thin stone head because, as Lothrop pointed out, it is done in a style very similar to that of certain thin stone heads found in the southern Guatemala-El Salvador area. A. V. Kidder has classified this piece as belonging to a group of Highland Guatemala sculptures he calls "silhouetted reliefs," and he illustrates another nearly complete specimen of the type that also represents a sculptured head projecting forward from a broad belt.[16] Although the belt is represented in the same manner as in the previous example, this head does not so nearly approximate any

FIG. 7. Sculpture from Finca Arevalo, Guatemala.

of the known thin stone heads. It is clear, however, that a sculptured head either of stone or of some other material was supported by a belt and is added confirmation of my suggestion that stone sculptures in the style of thin stone heads or the similar but more rounded forms could have been used in this way.

Another example of what appears to be a thin stone head fastened to a belt is to be seen on the first standing figure from the observer's left in the Tajín ball court relief shown in Figure 2. This head is fastened onto the belt, but differs from the other representations mentioned above in being placed on the back of the bearer's right hip. The head being in profile, it is again impossible to affirm that a thin stone head is represented; but having a swollen rounded headdress in a manner similar to that in Figure 1, *c*, and riding high on the belt, it appears to be a thin stone head attached in the manner suggested. Mrs. Spinden remarked on the resemblance of the head in the Tajín relief to cer-

[15] Lothr p, 1926, Fig. 48.

[16] Kidder, 1946, Pl. 141, *b*.

tain of the thin stone heads,[17] although she did not develop the hypothesis that these and similar stone objects had been designed for use in that way.

An additional illustration of what appears to be a thin stone head in use may be seen in a relief carving from the western corridor of the palace at Palenque.[18] In this a man sitting on a tiger throne is being presented with what appears to me to be a headdress with a sculptured face, of the style we are considering, projecting in front of it. The identification of this object as a headdress is uncertain, perhaps, but its general shape and its tall vertical-standing plumes seem to indicate that that is what it is. If it is, there arise the questions as to whether or not it is a stone sculpture incorporated in the headdress and, if so, how practical an arrangement that would have been. Considering the uncertainties involved, I shall not attempt to analyze the problem. This sculpture merely illustrates the possibility that thin stone heads may have been used in other ways than in belts.

In the same relief sculpture from Palenque, it must also be noted that the person making the presentation of the headdress has a sculptured ornament in the form of a head on the front of his belt. This does not resemble any of the thin stone heads that are known to me, but I suspect that it may be an example of another type of sculpture which was probably used in the same manner as the thin stone heads. I refer here to the numerous small sculptured heads found in Vera Cruz and neighboring portions of southern Mexico which may have either a notch or a short tenon on the back in the manner of the thin stone heads.

In conclusion, I wish to make it clear that the suggestions made here for the use of palmate stones and thin stone heads, as well as previously for the use of stone yokes, should not be taken too literally nor as attempts at complete and final explanations. All three of these classes of objects certainly had long and probably complex histories of use and change, and the few hints that have been gathered together cannot necessarily be expected to apply to all stages in their history. The materials from which they were made may have changed, and their functions and meanings may also have been radically altered during the course of their history. I would say further that the explanations I have submitted in these notes are admittedly tenuous ones and that more evidence must be discovered before they can be accepted with any certainty. They have been presented with considerable hesitancy and only with the expectation that others will agree with me in thinking that some explanation of such outstandingly curious and beautiful objects is better than none at all.

ADDITIONAL NOTES

The palmate stone shown in Figure 1, *a*, is from a private collection and became known to me through the reproduced photograph only after this paper was submitted for publication. The figure on the front of the *palma* is obviously wearing a yoke about the waist. Of particular interest here, however, is the small triangular knob extending out from the front of the yoke. This appears to represent a head fastened to the yoke in the manner suggested above for thin stone heads and for the small more rounded carvings having similar notches or tenons on the back surface. In this case the projecting knob is more or less triangular and might have been intended for an animal head, but the small scale of the carving and the coarseness of the stone probably prohibited any further delineation. It nevertheless confirms to a certain extent the thesis presented above that the thin stone heads and related carvings were attached to belts or yokes.

As possibly relating to the argument concerning the use of palmate stones attention should also be given to the relief sculptures on the benches of the great ball court at Chichen Itza, where sculptured rod-like objects are stuck into the belts of ball players. Like much of the sculpture at this site these important reliefs are poorly known, the only published reproduction of which I know being in Palacios' *Arqueología de México, culturas arcaica y tolteca*.[19] According to information received from Harry Pollock, the panel illustrated by Palacios is one of six showing almost exactly the same scene, the panels arranged symmetrically on the faces of the benches at the ends and in the center of the court.

The panel illustrated by Palacios shows two opposing files of richly dressed men approach-

[17] Spinden, 1933, p. 243.

[18] Maudslay, 1896–99, Vol. 4, Pl. 44.

[19] Palacios, 1937, Fig. 41.

ing a center point where there is a large circular object lying on the ground. That the scene is one of two opposing teams of ball players is suggested by the padded arms and knees and by the ball lying between them. With their feathers and other elaborate regalia, however, they could hardly be ready for actual play and would seem to represent more likely the symbolic, ceremonial-religious aspects of the ball game. Portrayed in magnificent detail the panel warrants extended study and comment.

Here, however, I wish to call attention only to the carved rod-like object stuck under the belt of each individual and extending upwards and forwards at about a 45° angle. Some of these rods end in snake heads and others in what appear to be representations of human skulls. Whether they could have been used in playing ball or what they could represent is a complete mystery to me. They are of interest, however, in regard to the previous discussion of the use of palmate stones, for like the objects thought to be palmate stones shown on the belts of the figures in the Tajín reliefs they stand up from the belts in a similar way and are also being used by ball players.

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THE METALLURGY OF THE SOUTHERN COAST OF PERU

WILLIAM C. ROOT*

A STUDY of the use of gold and silver by the ancient inhabitants of southern Peru and Bolivia has been made by Lothrop (1937). He found that in the region of the southern coast the available material from Paracas and Nasca was adequate, but that there was very little satisfactory material from the later periods, such as Ica. Many of the objects in museum collections that purport to be from Ica are of questionable origin, and many objects actually from Ica are thought to be from Lima, Moche, etc. This not only prevents a satisfactory investigation of the use of metals in Ica, but confuses a study of their use on the central and northern coasts.

The present study is an attempt to supply more exact information about the use of metals in the vicinity of Nasca, Ica, and Chincha. Max Uhle made very careful excavations in the Chincha and Ica valleys in 1901, and in the region of Nasca in 1903. His large collection of pottery, textiles, metal, and wood are preserved in the Museum of Anthropology of the University of California at Berkeley, California. They are of unusual importance as Uhle took notes on each grave he opened, numbering the artifacts as found and saving the imperfect objects as well as those of museum quality. Unfortunately Uhle published very little of this material.

The pottery and metal found by Uhle at Chincha has been described by Kroeber and Strong (1924*a*), the pottery from Ica by Kroeber and Strong (1924*b*), and the pottery from Nasca by Gayton and Kroeber (1927). This paper is based on Uhle's finds of metal at Nasca, Ica, and Chincha, and on chemical analyses of this and other material from American and Peruvian collections.

I am very grateful to Dr. Kroeber and Mr. Gifford for their assistance in my examination of the Uhle material, and for providing me with copies of catalog cards, photographs, etc. Without their help this study would have been impossible.

METHODS OF ANALYSIS

The methods of analysis were those described in Appendix II of Part I of Lothrop's *Coclé* (Root, 1937). The work was done in the chemical laboratory of Bowdoin College by students working under my direction. Many of the silver and copper objects were badly corroded, so the numerical values found were recalculated to a basis of 100 per cent of metal. This may have introduced error in some cases.

In the following tables (1–26) all objects are from the Uhle Collection at the University of California unless otherwise indicated. They are arranged by periods and sites. All finds of metal are included except minor objects of no apparent significance, some that are badly damaged or corroded, and a considerable quantity of scrap.

Where only a qualitative analysis was made, the amounts are reported as *L* for large (20% or more), *S* for small (1–20%), *Tr* for trace (0.01–1%), 0 for none or less than 0.01 per cent. The samples were analyzed for gold (Au), silver (Ag), copper (Cu), tin (Sn), lead (Pb), arsenic (As), zinc (An), mercury (Hg), and in some cases for antimony (Sb), bismuth (Bi), and cadmium (Cd). In no case was any mercury, arsenic, antimony, or bismuth found, and in only one case was zinc detected. These elements are therefore omitted from the tables.

All dimensions are given in centimeters unless otherwise indicated: diameter (D), height (H), width (W), length (L), thickness (T). Where two dimensions are given the first refers to the top, the second to the bottom of the object.

Several of the objects were sent to Dr. Morris Cohen of the Massachusetts Institute of Technology. He prepared polished sections of the metal, took photomicrographs of some of the sections, and gave interpretations of the structures revealed in the photographs.

SOURCES OF METAL

Gold. Thirty-six analyses were made of gold from the southern coast. The silver content ranged from a few per cent to as great as 50 per cent. In Table 1 is given the number of samples having a percentage of silver within the indicated limits. While there is no sharp separation into varieties of gold, there appear to be three types that are found more frequently than any others: Type A, nearly pure gold (0–5% silver); Type B, silver-rich gold (15–30%

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silver); Type C, a gold-silver alloy (35–50% silver).

Considerable variation in the composition of native gold is to be expected, especially if it is found as placer gold. A silver-rich nugget of gold on a moderate exposure to running water may lose nearly all of the silver near the surface of the nugget, and on long exposure may become almost pure gold. The composition of native gold is found to vary markedly from one placer to another in the same stream, and the gold from a tributary may be quite different from that of the main stream. It is only gold that has been mined which can be expected to have any constancy of composition. Most of the Peruvian gold was obtained from placers so any detailed classification is without significance.

Another factor that must be taken into account when considering the composition of gold and silver of the Middle and Late periods is that of the possible mixing in the melting pot of various types of gold, or gold and silver. Even though few cast objects are found, articles may have been melted down and the slug hammered into a sheet from which new objects were made. The data of Table 1 would lead to the conclusion that this may have happened in the Ica region, as most of the pure gold is found in the Paracas and Nasca periods, and the silver-rich gold in the Middle and Late periods.

The pure gold from Paracas and Nasca (Type A) has an average composition of 96 per cent gold, 2 per cent silver, and 2 per cent copper. This corresponds to 23 carat gold.

The silver-rich gold (Type B) has an average composition of 76 per cent gold, 20 per cent silver, and 4 per cent copper. The gold-silver alloy (Type C) is probably an artificial mixture.

Acosta (1880, pp. 192–3) writes, "The most famous golde is that of Caravaya in Peru, and of Valdivia in Chille, for that it riseth with his alloy and perfection, which is twenty-three carats and a halfe, and sometimes more. . . . Golde is commonly found mixt with silver or with copper but that which is mixed with silver is commonly of fewer carats than that which is mixed with copper. . . . They refine powdered golde in basens, washing it in many waters until the sand falles from it, and the golde as most heavie remaineth in the bottome."

Garcilasso de la Vega (1871, Vol. 2, pp. 409–10) writes, "Gold is collected throughout Peru, though in some provinces it is more abundant than in others. It is met with on the surface, and in the rivers and streams, where it is brought down by the freshes. Thence it is obtained by washing the earth and sand. . . . All the gold of Peru is of 18 to 20 carats (75–83%), a little more or less. Only that which is obtained from the mines of Callavaya or Callahuaya (Caravaya) is much finer, being of 24 carats (100%) . . . . " The Paracas gold is 23 carat, but as Caravaya is to the southeast of Cuzco, it is probable that it was obtained from placers nearer the coast.

Silver. The 67 analyses fall into two groups: Type A, fairly pure silver (0–20% copper); Type B, a silver-copper alloy (more than 20% copper). (See Table 2.)

Type A has an average composition of 1

TABLE 1. SILVER CONTENT OF GOLD OBJECTS

Type	*% Silver*	*Paracas*	*Nasca*	*Middle Ica II*	*Late Ica I*	*Ica*	*Totals*	*Type Totals*
A	0– 5	6	5		1		12	12
—	6–10		1				1	
	11–15				1		1	
	16–20	2	1		1	2	6	
B	21–25			1	4	5	10	20
	26–30			1	1	2	4	
—	31–35							
	36–40			1	1	1	3	
C	41–45							4
	46–50			1			1	

per cent gold, 91 per cent silver, and 8 per cent copper. Type B is an artificial mixture of variable composition, found in the late periods.

Silver and copper appear in quantity only in the Middle and Late periods. This is probably because native silver was infrequently found on the surface, and was obtained by a crude sort of smelting. Acosta (1880, pp. 195–6) writes, "the maner to purge and refine silver which the Indians have used was by melting, in dissolving this masse of metall by fire, which casts the earthly drosse aparte, and by his force separates silver from lead, tinne from copper, and other mettals mixt. To this end they did build small furnaces in places whereas the wind did commonly blow, and with wood and cole made their refining, the which furnaces in Peru they call huayras." Silver and copper must have been rare until this smelting process was discovered by the inhabitants of the highlands, perhaps during the Tiahuanaco period.

The source of the silver and copper may have been some distance away. Barba, in Chapters 27 and 28 of Book One of *Arte de los metales* (1923), describes various gold and silver districts of southern Peru, Bolivia, and northern Chile. Many of the principal silver mines of the Incas seem to have been near Porco in central Bolivia. Acosta (1880, p. 198) says that the Indians could smelt the silver of Porco because it contained lead. The silver of nearby Potosi was purer, but the Indians were unable to smelt it. Most of the silver at Ica contains traces of lead. This silver may not have come from Porco, but it was probably won from some similar region of plumbiferous silver ores by the process described by Acosta.

Copper. The sources of Peruvian copper have been discussed by Nordenskiold (1921), Boman (1921, pp. 135–9), etc. Since the copper on the southern coast has no characteristic impurity, its source cannot be ascertained. It is very likely from somewhere in the southern highlands, and was obtained in the same fashion as the silver.

THE PARACAS PERIOD

This early culture includes the first use of metal on the southern Peruvian coast, if not in all of Peru. Most of the objects found by Tello in his excavations are of native gold; a few may be of native silver. The eight objects analyzed are made from sheet gold. The analyses are given in Table 3. All of the objects are from Tello's excavations in the Necropolis at Paracas.

Table 2. Copper Content of Silver Objects

Type	*% Copper*	*Middle Ica II*	*Late Ica I*	*Late Ica II*	*Inca*	*Late Chincha I*	*Late Chincha II*	*Inca*	*Totals*	*Type Totals*
A	0–10	2	12	10	7	5	1	3	40	55
	11–20		2	4	6		3		15	
B	21–30		1			1	2		4	12
	31–40	1					3		4	
	41–50								0	
	51–60					2	1		3	
	61–70					1			1	

The six head ornaments are of the purest form of gold (Type A). The two smaller ornaments of foil are of the silver-rich gold (Type B)

Sections were made from three of the objects. 6, I, 2 and 13–454 showed no sign of any structure and so were not photographed. A photomicrograph of 13–455 at a magnification of 250 is shown in Figure 8, *upper left*. Dr. Cohen writes of this object, "The structure is sufficiently clear to show the presence of twinned crystals. This means that the sample has been cold-worked and then annealed at a sufficiently high temperature to produce a recrystallization. The grains are rather large and this means that the annealing temperature used was well beyond the recrystallization temperature of the alloy." This indicates that after hammering the native gold into thin sheets it was then heated to 500° –600° C. to relieve the stress set up by the hammering. This is perhaps

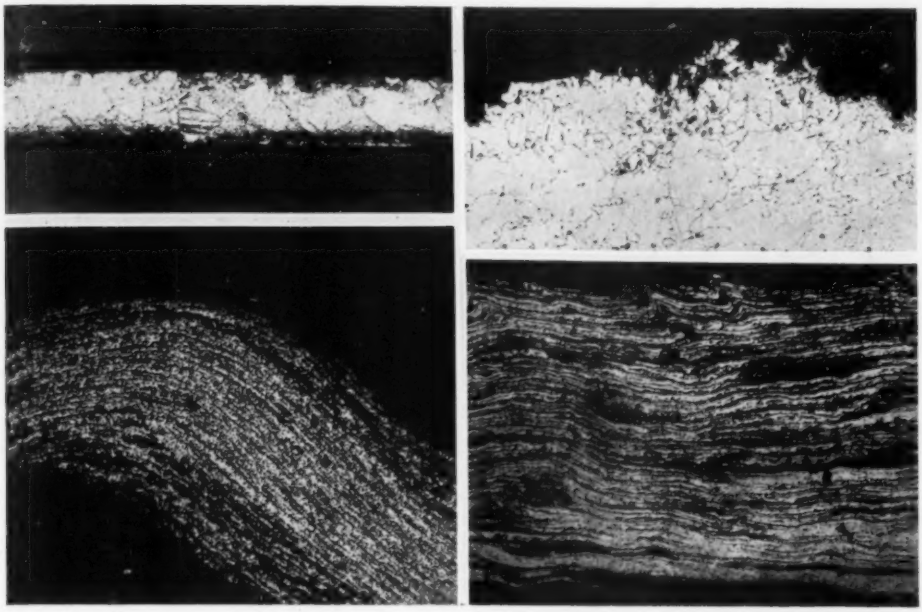

FIG. 8. Photomicrographs of Peruvian metal work. (See Tables 3, 9, and 16 for explanations.)

the earliest example of annealing in all of pre-Columbian America.

There is no reason to assume that at Parcas gold was ever fused, or that casting, welding, soldering, or gilding was known. The ornaments were made of sheet gold, beaten to a thickness of 0.04–0.06 mm., cut to the desired shape, and embossed or engraved as desired.

THE NASCA PERIOD

The Uhle collection contains only two pieces of metal of the Nasca period—a gold head ornament (9366; Fig. 9, *c*) and some gold beads (4690; Fig. 9, *a*). Fortunately Nasca metal work is fairly common in museum collections and is readily identified. The Museum of the American Indian, Heye Foundation, has a particularly fine collection. Nasca metal has been discussed by Lothrop in considerable detail in his paper "Gold and Silver from Southern Peru and Bolivia" (1937).

In Table 4 are listed the analyses of gold objects of Nasca origin. Two are shown on Figure 9, *a*, *c*.

TABLE 3. ANALYSIS OF METAL FROM PARACAS*

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Gold		Head ornament	Mummy 351	13-454	100	Tr	0			7.4 L, 4.5 W, 0.05 mm. T
Gold		Head ornament	Surface	13-453	99	1	0			10.0 L, 10.0 W, 0.04 mm. T
Gold		Head ornament	Mummy 28, II-A	13-457	97	0	3			10.1 L, 4.1 W, 0.10 mm. T
Gold		Head ornament	Mummy 143	12-8413	97	2	1			13.7 L, 6.8 W, 0.06 mm. T
Gold		Head ornament	Surface	13-449	95	5	0			16.5 L, 8.7 W, 0.04 mm. T
Gold	8, *upper left*	Head ornament	Surface	13-455	93	3	4			17.8 L, 5.6 W, 0.15 mm. T
Gold		Ornament	Mummy G, I, 2		78	18	4			1.2 L, 1.0 W, 0.04 mm. T
Gold		Ornament	Mummy G, II, 7		77	19	4			2.7 L, 0.8 W, 0.04 mm. T

* All objects are from the Necropolis and are now in the Museo de Antropología, Lima.

TABLE 4. ANALYSIS OF METAL FROM NASCA

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Gold		Disc	"Nasca"	17-8857*	100	0	0			4.3 D. Lothrop, 1937, Pl. XXXVI, *c*
Gold		"Mummy tears"	"Nasca"	11-2467*	97	S	3			8.5 L
Gold		Strip	"Nasca"	11-2465*	95	0	5			1.0 W
Gold		Bird ornament	"Nasca"	17-8851*	95	0	5			10.8 L, 5.4 W. Kroeber and Strong, 1924*a*, Pl. XXXVI, *f*
Gold		Head ornament		58†	L	S	S			
Gold		Head ornament		59†	90	0	10			
Gold	9, *c*	Head ornament	"Nasca"	9366‡	87	10	3			11.2 W, 11.4 H, 0.08 mm. T
Gold	9, *a*	Beads (7)	F-3	4690‡	L	L	S			0.5–0.7 D. Solder on four
Gold		Disc	"Nasca"	18-6561*	80	20	0			7.5 D

* Museum of the American Indian, Heye Foundation.
† John Wise Collection.
‡ Uhle Collection.

As with Paracas, most of the gold is of Type A. There is perhaps one example of the silver-rich gold. No object of silver or copper from this period has yet been found.

Lothrop (1937, p. 315, Pl. XXXVIII, *a*) shows a spear thrower which may have a cast gold peg. If it is cast, it is the only example of casting which is known earlier than the Late Ica period.

Of the seven gold beads, four show signs of solder. The solder was used to fasten the two halves of the bead together. It is of the same color as the metal. Lothrop (1937, p. 308, Pl. XXXIV, *a*) describes another example of soldering from Nasca. It is a head ornament representing a face. There are traces of solder on the chin. These are the earliest known examples of soldering from the south coast of Peru. Soldering must have been practiced from this time on, but for some reason never became popular. Even in Late Ica times it was seldom employed.

The method of soldering cannot be told from these examples. In the Chimu region there is good reason to believe that the method used is the one Bergsøe (1938, p. 50) has suggested was followed in Esmeraldas (Root, 1941). It may also have been used in Nasca and Ica.

This method was originally worked out by Littledale (1936, pp. 44–63) from a study of Greek and Roman jewelry. A mixture of gum and some powdered copper salt was applied to the gold surfaces to be soldered. This was slowly heated until the gum charred and reduced the copper salt to metallic copper. The copper combined with the gold to form a lower melting alloy which on cooling formed a strong joint which was almost invisible and had the color of gold. There is no evidence, as Bergsøe has pointed out, for assuming that mercury soldering was ever used in America.

Nasca metal work on the whole is as simple as in the Paracas period, and the principal metallurgical processes in use were still hammering and embossing. Influence from the Chimu region to the north, where copper was in use, and where casting, soldering, and gilding were well developed, was very slight, if it existed at all.

COAST TIAHUANACO PERIOD

The Uhle collection contains only one example of metal from the Early Ica period, although 15 graves of this period were opened. This is a fragment of curved copper sheet, which may be part of an earspool. Possibly it is a trade piece, as it is of copper (Table 5).

During this period and the first part of the

TABLE 5. ANALYSIS OF METAL FROM EARLY ICA

Color	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Copper	Earplug, fragment	E-6	4488	Tr	L	L			1.4 I, 2.5 D

FIG. 9. Metalwork from Nazca and Middle Ica II. (See Tables 4 and 7 for explanations.)

Middle period metal seems to have been very little used on the southern coast. This may have been due to a stoppage of the supply of gold from the mountains or to exhaustion of placer deposits. Knowledge of metallurgy may even have disappeared altogether. When metal once more makes its appearance (in Middle Ica II) it is used in a different fashion than before, although the processes employed are still the same.

THE MIDDLE PERIODS

MIDDLE CHINCHA

Uhle found no graves at Chincha from the Middle period (Kroeber and Strong, 1924*a*), so it is not known if metal was used in the Chincha Valley during this period. Kroeber (1937, Pl. 77, *5*) found one metal object in excavations at Cerro del Oro in the Canete Valley, the next valley to the north. This was a bell of sheet copper, 4.0 cm. wide with a stippled surface. There was no trace of gold or silver. "The intactness to date of most Middle tombs argues against the occurrence of precious metals in the culture."

MIDDLE ICA

Five Middle Ica I graves were opened by Uhle but no metal was found. Of twelve Middle Ica II graves six contained metal, 40 objects in all (Table 6).

TABLE 6. METAL FROM MIDDLE ICA

	Gold	*Silver*	*Copper*	*Total*
Site M	18	4	8	30
Site S, Grave e	1		1	2
Site S, Grave f		1	1	2
Site Z, Grave 1			1	1
Site Z, Grave 4		4		4
Site Z, Grave 5		1		1
Totals	19	10	11	40

The silver and copper appear to be well distributed. The bulk of the gold is concentrated in one grave. No metal from this period was found at Nasca.

In Table 7 are given the analyses that were made of the metal from Middle Ica II. All of the objects in this and the following tables are from the Uhle collection in the Museum of Anthropology at the University of California. The three numbers before the serial number represent the site, the grave, and the burial from which the object was obtained. The words gold, silver, or copper before the name of the objects refers to the color of the object, not its composition.

Middle Ica II gold contains more silver than that of any other period. The average composition is 49 per cent gold, 39 per cent silver, 12 per cent copper. This is more silver than can be assumed to occur in native gold, so it must be assumed to be an artificial alloy. It is not clear why this alloy should have been used. It has a lower melting point than either pure gold or pure silver, but this cannot be the reason, as none of these objects are cast. It may have been an accidental alloy formed by melting together objects of gold, silver, and then throwing in enough copper to give the desired color. A mixture of equal weights of silver and gold is very pale in color. The addition of copper gives the mixture a yellow color almost like that of pure gold. A similar alloy is found at Pachacamac and Marquez further to the north. Three of the silver objects contain so much copper they must be made from an artificial alloy. This alloy was much used at Chincha. Its properties will be described when the objects from the Late Chincha period are considered.

The copper objects are free from arsenic, and only one contains a trace of tin. This is insufficient to be called a bronze. We can assume, therefore, that bronze was not known on the southern coast during the Tiahuanaco and Middle periods.

In general the objects from Middle Ica II sites are simple in form and involve only hammering and embossing. A copper axe head (4445; Fig. 10, *b*) may have been cast. A number of hollow gold gold beads (4400; Fig. 9, *f*) were made by soldering two half spheres together. This is the only soldered object from Middle Ica II.

The form and decoration of the metal objects of this period can be seen in Figures 9 and 10. The characteristic rows of small dots and the figure of a bird appear for the first time. The tweezers are of the type that Kroeber calls kite-shaped. Objects of particular interest include the following:

4444A (Fig. 10, *a*) is a copper disc, perhaps a club head. Uhle states that a wooden handle, encased in sheet copper, was thrust into the hole in the disc to form a club or mace.

4446A (Fig. 10, *c*) is a large copper disc. It may be a mirror, or the head of a large cloak pin.

TABLE 7. ANALYSIS OF METAL FROM MIDDLE ICA II

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver		Fragment of disc	M	4287	Tr	L	L		Tr	4 D
Gold	9, *d*	Disc	M	4397	51	39	10			16.8 D, 0.35 mm. T
Gold	9, *e*	Armlet	M	4398	45	48	7			6.7–8.0 D, 13.4 H, 4 mm. T
Gold		Earplug, face (?)	M	4399	50	30	20			2.8 D, 1.4 mm. T. Spherical
Gold	9, *f*	Beads (15)	M	4400	L	L	S			0.5–2.0 D. Soldered
Silver		Fragment of cuff	M	4401B	12	17	71	Tr	Tr	5–6 D
Copper	9, *b*	Earplug	M	4402A						2.7 D, 1.1 L
Copper	10, *g*	Tweezers	M	4402B						2.9 L, 1.7 W. Kroeber and Strong, 1924*a*, Type 4
Silver		Fragment of disc	M	4402C	2	25	75			6? D
Copper	10, *a*	Club head	M	4444A		S	L			13.6 D
Copper		Sheathing	M	4444B	S	L	L			
Copper	10, *b*	Axe	M	4445						10.5 L, 5.2 W
Copper	10, *c*	Mirror (?)	M	4446A						11.6 W, 9.4 H, 7.0 mm. T
Copper		Disc	M	4446B			L			11.8 D
Silver		Fragment of plate	M	4446C	5	94	1			
Silver	9, *g*; 10, *e*	Headband	Z-4	4842A	12	81	7		Tr	43 L, 4.5 W
Silver	10, *d*	Cuff	Z-4	4852	3	64	33			7.1 H, 7.0 D
Silver	10, *i*	Pendant	Z-4	4853						3.4 H, 2.1 W
Silver	10, *j*	Pendant	Z-4	4853						3.8 H, 2.1 W
Gold		Bead	S-e, 2	5489	66	25	9			1.2 D
Copper	10, *h*	Tweezers	S-e, 2	5492						4.0 L, 2.3 W. Kroeber and Strong, 1924*a*, Type 3
Copper	10, *f*	Mask	S-f	5495A		L	L	Tr	Tr	14 W, 9 H

4398 (Fig. 9, *e*) is a gold armlet. The bosses were punched from behind with a small instrument in a spiral of increasing size.

4842A (Figs. 9, *g*; 10, *e*) is a silver headband from a mummy. It is divided into rectangles by double rows of small dots. Each rectangle contains the figure of a bird.

It seems certain that metals were not used continuously at Ica from the Nasca period, but that there was a gap of several hundred years when few metal objects were to be found. The re-introduction of metal in the Middle Period brought the use of the gold-silver and silver-copper alloys, and new types of decoration. The source of this new knowledge will be uncertain until the metallurgy of the central coast and the southern highlands is better known. There are some resemblances between Middle Ica work and objects from Pachacamac, Chuquitanta, and Marquez. There is a slight resemblance to work from Tiahuanaco. There is little resemblance to work from the Chimu region.

THE LATE PERIOD

Metal objects are much more abundant in Late Ica and Late Chincha graves than in those of earlier periods. Most of the metal cups, beakers, dishes, etc., from Ica in museum collections are probably from this period. Their appearance is shown in Figures 11–18.

LATE ICA I

Of the seven sites of the Late Ica I period, two contain metal, 41 objects in all (Table 8). The analyses of these objects are given in Table 9 and some of them are illustrated in Figures 11–15.

TABLE 8. METAL FROM LATE ICA I

	Gold	*Silver*	*Copper*	*Total*
Site T, Grave f		6		6
Site T, Grave h	12	23		35
Totals	12	29	0	41

One object is of the fine gold (Type A) used earlier at Paracas and Nasca, but most are of the silver-rich variety (Type B). There is only one example of the gold-silver alloy (earplug, 5274A) so frequent in Middle Ica II. The silver is of the usual type except for a beaker (5272C; Figs. 11, *h*; 12, *h*), which may be of silver-copper alloy.

All of the gold and most of the silver is from

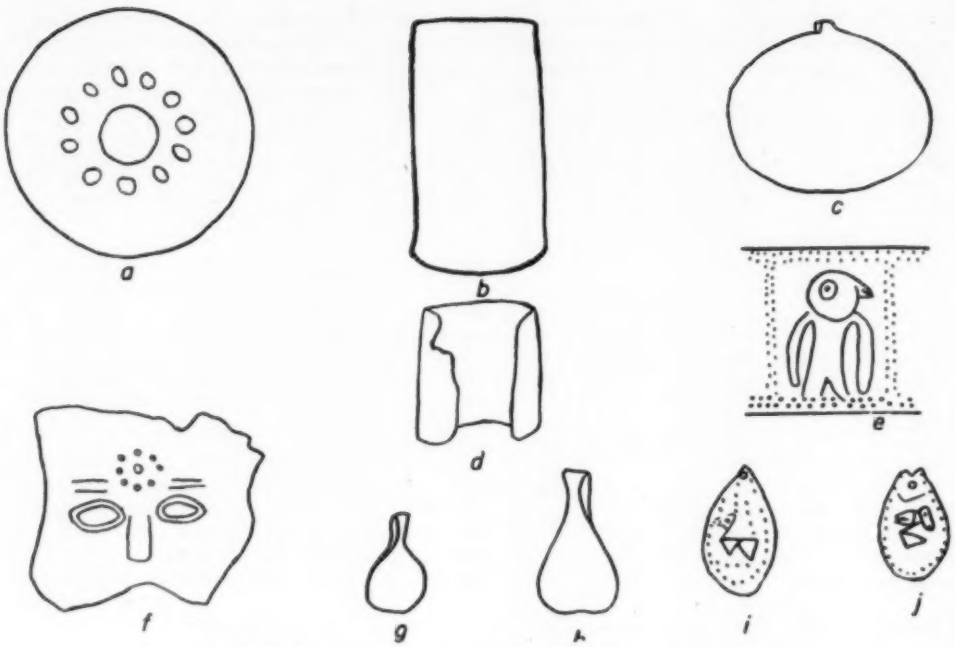

FIG. 10. Metalwork from Middle Ica II. (See Table 7 for explanations.)

a single grave (Site T, Grave h, Burial 1) in the Ica Valley on the road between Chulpaca and Tate. Uhle wrote of it (in Kroeber and Strong, 1924*b*, p. 126), "Intact, and the richest grave discovered. It is curious that no two of the rich graves opened in the past few weeks agree in kind of objects contained, although the style and type of civilization represented are uniform." (The other two graves referred to were Site T, Grave c—probably Late Ica I—and Site T, Grave a—late Ica II).

5256 and 5257 (Fig. 11, *g*) are two gold armlets.

5262 (Fig. 11, *i*) is one of four similar silver dishes. Each was hammered from a single piece of silver, and the bottom embossed with a geometrical design.

5252 (Fig. 13, *a*) is a mask of sheet gold. 5253 is a piece of sheet gold of almost exactly the same size embossed with a simple design.

5268 (Figs. 11, *j*; 12, *b*) is a silver dish with a flat bottom embossed with a fish and two birds. Two similar dishes (5269 and 5270) have flat bottoms decorated with birds (Fig. 13, *g*).

5254 (Fig. 13, *e*) is a gold effigy cup. It is made in two parts. The upper portion is 8 cm. long and overlaps the 12 cm. lower portion by 1 cm. The two sections are fastened by some sort of gum rather than solder. The ears are soldered to the cup with a gold colored solder.

5276 (Fig. 14, *c*) is one of 39 oval silver pendants. They are not identical and so cannot have been hammered out on a mold. Some still have fragments of brown fabric sticking to them.

5258 (Fig. 11, *c–e*), includes 3 of 29 oval gold pendants. The central figure was perhaps hammered out on a mold, but not the dots.

5260A is a fragment of sheet gold, found in the mouth of a skull.

5274A is a gold earplug. The face shows a ring of dark-colored solder, which is silvery gold when freshly cut. The silver stems (5275) fit the solder marks.

5103 is a silver earplug. The face is fastened to the stem by gum.

None of the objects is cast.

LATE ICA I (?)

Site T, Grave c is difficult to classify. Uhle writes of this grave (in Kroeber and Strong, 1924*b*, p. 126), "Besides the large burial pot, there was only one pottery vessel and that little ornamented. There were two wooden implements beside the burial pot, uncarved and

TABLE 9. ANALYSIS OF METAL FROM LATE ICA I

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver		Earplug, face	T-f	5103		L	Tr		Tr	3.4 D
Silver		Earplug, stem	T-f	5103		L	Tr		Tr	1.7 D
Silver	15, *f*	Tweezers	T-f	5104A						2.4 W, 4.0 L. Kroeber and Strong, 1924*a*, Type 4
Silver	15, *e*	Tweezers	T-f	5104B						1.9 W, 4.0 L. *Op. cit.*, Type 4
Silver	14, *b*	Tweezers	T-f	5112	Tr	L	S		Tr	2.6 W, 3.6 L. *Op. cit.*, Type 7
Silver	8, *lower left*	Disc	T-f	5112	0	87	13		Tr	7.5 D, 0.28 mm. T
Gold		Band	T-h, 1	5251	72	23	5			52 L, 4.0 W, 0.3 mm. T
Gold	13, *a*	Mask	T-h, 1	5252	80	18	2			16.0 H, 15.5–19.0 W, 0.5 mm. T
Gold		Mask (?)	T-h, 1	5253	74	23	3			16.0 H, 15.5–20.6 W, 0.4 mm. T
Gold	13, *e*	Effigy cup	T-h, 1	5254	84	12	4			19.0 H, 8.0–7.0 D. Soldered
Gold	11, *f*	Beaker	T-h, 1	5255						12.1 H, 12.1–8.2 D
Gold	11, *g*	Armlet	T-h, 1	5256						14.3 H, 17–24 W
Gold		Armlet	T-h, 1	5257	L	L	S			14.8 H, 5.8–7.0 D, 2.8 mm. T
Gold	11, *c–e*	Pendants (29)	T-h, 1	5258	70	26	4			4.6 L, 3.0 W, 0.25 mm. T
Gold		Pendants (4)	T-h, 1	5259						2.5 L, 1.6 W, 0.17 mm. T. Plain
Gold		Fragment of plate	T-h, 1	5260A	93	3	4			1.0×1.0. In mouth of skull
Silver	11, *l*	Dish	T-h, 1	5261	0	97	3		Tr	8.5 H, 23.0 D
Silver	11, *i*	Dish	T-h, 1	5262	0	92	8		Tr	8.0 H, 21.5–23.0 D
Silver		Dish	T-h, 1	5263	2	95	3			8.1 H, 22.5 D. Like 5261
Silver		Dish	T-h, 1	5264						8.4 H, 22.5 D. Like 5261
Silver	8, *upper right*	Dish	T-h, 1	5265	0	93	7		Tr	8.3 H, 23.0 D
Silver	11, *m*; 12, *a*	Dish	T-h, 1	5266						5.5 H, 17-13 D
Silver	11, *k*	Dish	T-h, 1	5267	1	87	12			5.0 H, 13.5–14.6 D. Plain
Silver	11, *j*; 12, *b*	Dish	T-h, 1	5268	2	88	10		Tr	4.6 H, 12.4–11.8 D
Silver	13, *g*	Dish	T-h, 1	5269						Ca. 0.4 H, ?–9.8 D
Silver		Dish	T-h, 1	5270						Ca. 0.4 H, ?–9.8 D. Like 5269
Silver	12, *e*	Beaker	T-h, 1	5271A	0	92	8			13 H, 11–7.2 D
Silver		Beaker	T-h, 1	5271B						10 H, 11.5–7.5 D. Plain
Silver	12, *c*	Effigy cup, fragment	T-h, 1	5271C	0	92	8		Tr	8.3 D, 0.26 mm. T
Silver		Effigy, cup, rim	T-h, 1	5271D		L	S			9.3–8.5 D
Silver	11, *h*; 12, *f*	Beaker	T-h, 1	5272A						10.5 H, 9.8–6.7 D
Silver	11, *h*; 12, *g*	Beaker	T-h, 1	5272B	0	94	6		Tr	13.0 H, 10.1–7.4 D
Silver	11, *h*; 12, *h*	Beaker	T-h, 1	5272C	0	72	28		Tr	13.0 H, 10.5–7.0 D
Silver	12, *d*	Effigy cup, fragment	T-h, 1	5273	8	86	6			
Silver		Earplug, face	T-h, 1	5274A	57	37	6			4.1 D. Soldered
Silver		Solder plug, face	T-h, 1	5274A	8	87	5			
Silver		Earplug, face	T-h, 1	5274B						4.1 D. Soldered
Silver		Earplugs, stem (2)	T-h, 1	5275	1	96	3		Tr	2.5 D, 2.4 L. Stems of 5274?
Silver	14, *c*	Pendants (39)	T-h, 1	5276		L	S		Tr	3.5 W, 5.1 L. Not identical

inferior to those in T-a. Nevertheless the grave was the richest I ever opened, seven objects of gold in it aggregating a weight of 500 grams. Curiously enough, T-a, so much richer in other contents, held only silver, though much of that. Besides the gold, there was so little in T-c that it is difficult to decide its attribution to the end of the pre-Inca Chincha period (Late Ica I or II) or to the time when the Incas occupied Ica."

The analyses of the objects from this site are given in Table 10, and they are shown in Figures 11, 13, and 14. They consist of the silver-rich (Type B) gold, similar to that found in Late

FIG. 11. Metalwork from Late Ica I and I (?). (See Tables 9 and 10 for explanations.)

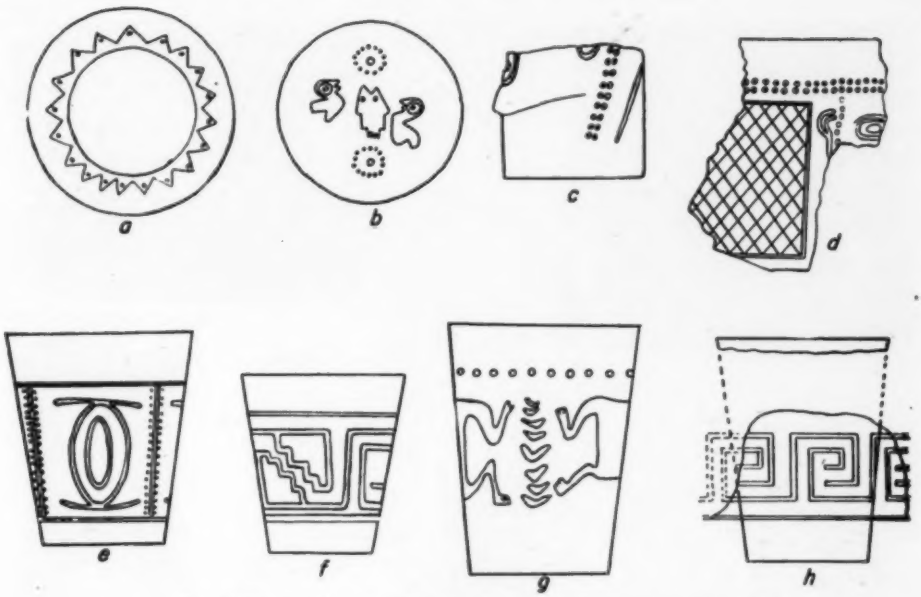

FIG. 12. Silver artifacts from Late Ica I. (See Table 9 for explanations.)

Ica I graves, and resemble in style objects of Late Ica I rather than Late Ica II or Inca times.

4984 (Fig. 13, *b*) is a mask. It was worked from both sides. 4982 (Fig. 13, *c*) is an effigy cup made in one piece, as is 4983, also shown as Figure 13, *d*.

None of the objects is cast. This grave can be considered to be one of the Late Ica I period.

LATE ICA II

Of three sites, one had metal (Table 11). Uhle writes of this site (in Kroeber and Strong, 1924*b*, p. 126) "A large grave. . . . It was one of the most curious tombs and one of the richest in silver I ever opened, though many objects were partly decomposed."

TABLE 10. ANALYSIS OF METAL FROM LATE ICA I (?)

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Gold		Band	T-c	4981	73	25	2			67 L, 6.0 W, 0.15 mm. T
Gold	13, *c*	Effigy cup	T-c	4982						15.5 H, 6.4–4.2 D. 102 grams
Gold	13, *d*	Effigy cup	T-c	4983						15.5 H, 6.4–4.2 D. 98 grams
Gold	13, *b*	Mask	T-c	4984	71	25	4			13.9 H, 18.2 W, 0.12 mm. T
Gold	13, *f*	Dish	T-c	4985	L	L	Tr			3.4 H, 13.2–15.0 D. 198 grams
Gold		Tweezers	T-c	4986						3.5 L, 2.1 W. Kroeber and Strong, 1924*a*, Type 8
Gold	11, *a*	Tweezers	T-c	4987	L	S	S			2.5 W, 3.9 L
Silver		Earplug, disc	T-c	5009A						4.3 D
Silver		Earplug, disc	T-c	5009B						4.0 D
Silver	14, *a*	Earplug	T-d, 6	5006A						3.5 D face. Stem 1.5 D, 1.6 L
Silver		Earplug	T-d, 6	5006B						3.5 D face. Stem 1.5 D, 1.6 L
Gold	11, *b*	Pendants (4)	T-g	5119						5.5 L, 2.8 W. All alike
Silver		Dish	T-g	5318		L	S		Tr	11 D, 5.0 H. Stepped

FIG. 13. Gold artifacts from Late Ica I and I (?). (See Tables 9 and 10 for explanations.)

TABLE 11. METAL FROM LATE ICA II

	Gold	*Silver*	*Copper*	*Total*
Site T, Grave a	0	51	3	54

The objects from this grave, Site T-a, are shown in part in Figures 14–16, and the analyses are given in Table 12. Most of the specimens seem to have the same composition as the silver from Late Ica I. Several have enough copper to be considered silver-copper alloys. This alloy

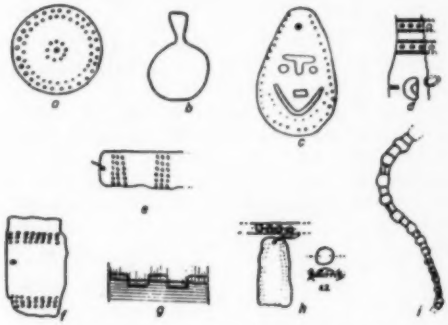

FIG. 14. Silver artifacts from Late Ica I, I (?), and II. (See Tables 9, 10, and 12 for explanations.)

corrodes very easily, a fact which is probably one of the reasons why most of the objects from this grave were in a badly corroded state. The club head (4940) is the only example of bronze found in a Late Ica grave. Most of the dishes and beakers have a hammered flanged rim, sometimes decorated with crosshatching (e.g., 4912; Fig. 16, *b*).

4952 (Fig. 15, *h*, *i*) consists of seven silver tweezers ornamented with transverse coiled prongs. It is impossible to tell whether the prongs were soldered or fastened with gum. 4930 is a plume holder fastened together by insertion of projections from a metal sheet into slits in the other. 4947 (Fig. 14, *g*) is similarly fastened.

4933 (Fig. 14, *i*) is a roll of cloth about 3 feet long, fastened by 70–80 silver bands about 1 cm. apart. The ends of the silver bands are fastened by threads.

4917B are several large pieces of heavy curved plate, perhaps part of a skull cover.

4937 is a wooden "paddle" with a carved bird finial. The handle was covered with silver sheet fastened with silver tacks.

4938, 4939 (Fig. 15, *j*) is a wooden "paddle" with a cast silver bird finial. The blade is 75 cm. long, the handle 120 cm., the bird 14 cm. The handle and upper 7 cm. of the blade are covered with thin silver sheet fastened with silver tacks.

FIG. 15. Silver artifacts from Late Ica I and II. (See Tables 9 and 12 for explanations.)

4940A (Fig. 15, *g*) is a cast copper club head with hollow fins. The handle is wound with a spiral silver wrapping 1.3 cm. wide with a 3 mm. overlap. The handle and winding was forced into the opening in the club head.

4941 is a similar copper club head with silver covered handle.

4925, etc., are four earplugs of the mushroom type. There are two grooved earplugs of the spool type with solid ends (4922, 4923). One still has a rattle inside. All are so corroded it is impossible to tell how they are fastened together and if the faces were plain or decorated.

TABLE 12. ANALYSIS OF METAL FROM LATE ICA II

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver	15, *a*	Effigy cup	T-a	4904						16.5 H, 6.5 D
Silver	16, *a*	Effigy cup, fragment	T-a	4905		L	S		Tr	18? H, 10.2 D
Silver		Effigy cup, fragment	T-a	4905A	3	87	10		Tr	11? D
Silver		Beaker	T-a	4906	2	81	17		Tr	13.2 H, 12.5–8.1 D. Plain
Silver		Beaker	T-a	4907						13.2 H, 12.8–8.0 D. Plain
Silver		Beaker	T-a	4908						8.3 H, 8.3–5.9 D. Plain
Silver	15, *b*	Beaker	T-a	4909A		L	L		Tr	8.2 H, 7.8–5.3 D. Plain
Silver	15, *b*	Beaker	T-a	4909B						8.2 H, 7.8–5.3 D. Plain
Silver		Effigy cup, fragment	T-a	4910	0	92	8		Tr	Like 4905
Silver	15, *d*	Mask (?)	T-a	4911	7	92	1		Tr	14 W, 7.5 H
Silver	14, *d*	Effigy cup, fragment	T-a	4911A	0	83	17		Tr	
Silver	16, *b*	Dish	T-a	4912						4.0 H, 13.1–13.5 D
Silver		Dish	T-a	4913		L	S		Tr	3.9 H, 12.8 D. Like 4912
Silver	16, *c*	Dish, fragment	T-a	4914	6	84	10		Tr	5 H, 18 (?) D
Silver		Dish, fragment	T-a	4915	0	90	10		Tr	13? D. Plain
Silver		Dish	T-a	4916	0	89	11			3.5 H, 14.0–16.0 D. Plain
Silver		Beaker, fragment	T-a	4917	0	92	8		Tr	9.5 D
Silver		Skull cover(?)	T-a	4917B	8	88	4		Tr	19? L, 13 W
Silver		Dish, fragment	T-a	4917C	0	92	8		Tr	4.5 H, 18.6–? D. Like 4912
Silver	16, *d*	Crescent	T-a	4918	Tr	L	L		Tr	31 L, 7 W
Silver	14, *f*	Armlet, fragment(?)	T-a	4918A		L	S		Tr	9 L, 6 W
Silver	14, *h*	Pendants (10)	T-a	4919	0	97	3			7.5 L, 3.4 W
Silver		Earplug	T-a	4922						2.3 D, 1.5 L. Like 4083B
Silver		Earplug	T-a	4923						2.3 D, 1.5 L. Like 4083 B
Silver		Earplug	T-a	4925						Face 5.2 D. Stem 1.7 D, 2.5 L
Silver		Earplug	T-a	4926		L	S		Tr	Face 5.4 D. Gold inlay
Silver		Earplug, stem	T-a	4927						1.2 L. Solid end
Silver	15, *c*	Tweezers	T-a	4928						5.0 L, 1.8 W. Kroeber and Strong, 1924a. Type 5
Silver		Plume holder, fragment	T-a	4929						9 L, 5.5–1.0 D
Silver		Plume holder	T-a	4930	S	L	S		Tr	9.2 L, 3–1 D. Effigy type
Silver	16, *e*	Bird ornament	T-a	4931	4	92	4		Tr	44 L, 27 W, 0.85 mm. T
Silver	14, *i*	Rings (70–80)	T-a	4933	S	L	S		Tr	0.6–1.0 D
Silver		Paddle, sheathing	T-a	4937	10	76	14		Tr	159 L, 3.5 W
Silver	15, *j*	Paddle, sheathing	T-a	4938		L	S		Tr	209 L. Blade 22 W
Silver	15, *j*	Paddle, bird	T-a	4939	4	92	4			15 H, 15 L, 8.5 W
Copper	15, *g*	Club head	T-a	4940A			L	S		9 D, 6 H
Silver		Sheathing of 4940A	T-a	4940D	Tr	L	S		Tr	1.3 W. Staff 2.3 D
Copper		Club head	T-a	4941A						8 D, 6 H. Like 4940A
Silver		Sheathing of 4941A	T-a	4941B	Tr	L	Tr		Tr	1.2 W. Staff 2.2 D
Silver	14, *g*	Plume holders (4)	T-a	4947	Tr	L	S		Tr	8 L, 4–1 D. One has face
Silver	14, *e*	Head bands (3)	T-a	4949A		L	S			3.0–3.8 W
Silver		Sheathing, fragments	T-a	4950		L	Tr		Tr	1.6 W
Copper		Earplugs (2)	T-a	4951						Face 5.0 D. Stem 1.2 D, 2.5 L
Silver	15, *h*, *i*	Tweezers (7)	T-a	4952	Tr	L	S		Tr	10–12 L. Prongs
Silver		Tweezers (2)	T-a	4953	Tr	L	S		Tr	11 L. Prongs
Silver		Tweezers, fragment	T-a	4954						Prongs

COMMENTS ON LATE ICA METALWORK

A photomicrograph of a section 5112, a silver disc of the Late Ica I period, is reproduced in Figure 8, *lower left* (87% silver, 13% copper). The mixture of silver and copper has separated into a light etching silver-rich phase and a dark etching copper-rich phase. Cohen writes "Both have have been streaked out in the direction of flow by some form of cold working process, probably hammering. The banded structure in general is quite indicative of severe plastic deformation." There is no indication of annealing.

Figure 8, *upper right* is a photomicrograph of a section of 5265, a large silver dish of the same period (93% silver, 7% copper). Cohen writes, "The presence of twinned crystals demonstrates that this sample has been cold-worked and annealed beyond the recrystallization temperature. The grains are composed of a silver-rich solid solution but there are traces of a copper-rich solid solution along the grain boundaries, and corrosion seems to have taken place preferentially along these boundaries, probably due to galvanic action. There is no sign that the metal has been cold worked after the financial annealing operation." This shows that the dishes, cups, and other large metal objects were annealed by heating after they had been hammered out, to relieve the strains caused by the hammering.

The principal metallurgical processes in use in the Late Ica period were, as in the Middle period, still hammering and embossing. The large silver dishes, so characteristic of Late Ica metalwork, were hammered from a single piece of silver and were annealed. Soldering was not involved. The large cups were made in either one or two pieces.

Late Ica I has no cast objects. Late Ica II has three, the silver bird (4939) and the two bronze club heads (4940, 4941). Soldering is occasionally found. There is no filagree or cut-out work, and no gilding or silvering.

LATE CHINCHA I

The metal from Chincha has been described in the first of Kroeber's papers on the Uhle material (Kroeber and Strong, 1924*a*, pp. 39–45). It differs in several particulars from that of Ica. Copper is much more abundant. Gold is absent. The silver-copper alloy is more frequently used than in Ica. Silver dishes and cups are less common. Smaller objects are more elaborate and there are some examples of filagree. There are many head bands. This difference may be more apparent than real, as no rich graves, comparable to those of Ica, have been found. Most of the Chincha graves contain from 3–10 metal objects; only one has as many as 20; and none is very rich. Of 25 Late Chincha I sites, 12 have metal (Table 13). The objects are illustrated in part in Figures 17 and 18, and the analyses are given in Table 14.

TABLE 13. METAL FROM LATE CHINCHA I

	Gold	*Silver*	*Copper*	*Total*
Site B, Grave 5		4		4
Site B, Grave 8		4	1	5
Site B, Grave 10		1		1
Unknown		1		1
Site C, Grave 7		2	1	3
Site C, Grave 9		3	1	4
Site C, Grave 12		1	2	3
Site C, Grave 13		2	3	5
Site C, Grave 14		4	4	8
Site E, Grave 1		2	2	4
Site E, Grave 3		6		6
Site E, Grave 10			3	3
Totals	0	29	17	46

3781 consists of linked silver loops. These are welded or soldered at the ends.

3930B (Fig. 18, *i*) is a silver effigy vase. This is in fragments. It was perhaps a double effigy cup. 3930A is also an effigy cup (Kroeber and Strong, 1924*a*, Fig. 27, *b*).

3687, 3709 are silver dishes. They are smaller than the dishes found at Ica.

Most of the silver and copper objects are badly corroded. The tweezers and earplugs are more common than at Ica. These have been described and illustrated by Kroeber and Strong (1924*a*, pp. 39–44).

LATE CHINCHA II

Of 13 sites, 10 have metal (Table 15). The objects of Late Chincha II are illustrated in part in Figures 17 and 18. The analyses are given in Table 16.

4083A (Fig. 17, *k;* Kroeber and Strong, 1924*a*, Fig. 24, *b*) is a silver earplug, either soldered or welded.

3746 (Figs. 17, *l;* 18, *h*) is perhaps the face of a silver earplug. The filets are soldered at every three or four points of contact.

3734 is a fragment of a peculiar small copper object, perhaps a dish.

TABLE 14. ANALYSIS OF METAL FROM LATE CHINCHA I

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver		Dish	B-5	3687	1	89	10		Tr	9.5 D. Plain
Silver	17, *c*	Tweezers	B-5	3689	0	30	70		Tr	3.5 L, 2.7 W. Kroeber and Strong, 1924*a*, Fig. 23, *a*
Silver		Fragment of plate	B-5	3690		L	L		Tr	
Silver		Fragment of plate	B-5	3691	2	98	0		Tr	6 L
Silver		Fragment of plate	B-5	3703A	0	44	56	Tr		Embossed
Silver		Dish	B-8	3709	Tr	L	L		Tr	1.2 H, 6.0 D
Silver		Disc	B-8	3710D	0	96	4		Tr	1.7 D
Silver	18, *f*	Embossed plate, fragment	B-8	3710E	2	44	54		Tr	7 L, 5 W
Copper		Fragment of plate	B-8	3710F		L	L		Tr	6 L, 2.5 W
Silver		Tweezers (3)	C-7	3775						3.8 L, 2.9 W. *Op. cit.*, Fig. 22, *l*. Type 8
Copper		Fragment of foil	C-7	3776M	0	15	85		Tr	4.5 L, 3.0 W
Silver		Links	C-9	3781	0	88	12			8.8 L, 1.3 W. Soldered
Copper		Tweezers	C-14	3826						4.0 L, 1.9 W. *Op. cit.*, Type 4
Silver		Tweezers	E-1	3903						*Op. cit.*, Fig. 22, *k*. Type 8
Silver		Earplug	E-3	3920	0	75	25			2.1 D, 0.7 M. Drum type
Silver	17, *j, n*	Earplugs (2)	E-3	3921						2.2 D, 0.7 M. Drum type
Silver		Effigy cup, fragment	E-3	3930A						17 H, 6 D. Kroeber and Strong, 1924*a*, Fig. 27, *b*
Silver	18, *i*	Effigy cup	E-3	3930B	3	87	10		Tr	30 H, 8.1 D. *Op. cit.*, Fig. 27, *a*

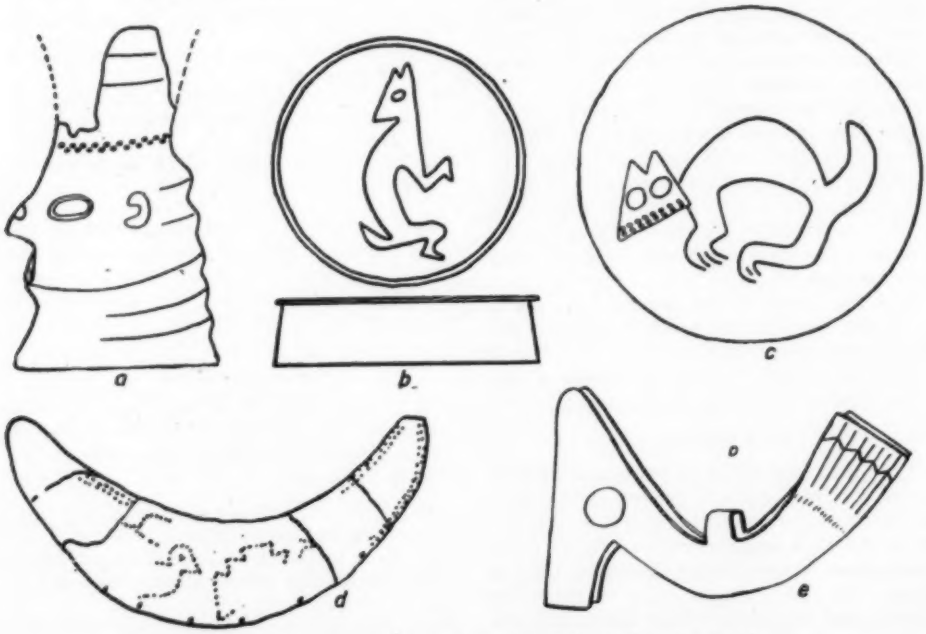

FIG. 16. Silver artifacts from Late Ica II. (See Table 12 for explanations.)

FIG. 17 Metalwork from Late Chincha I, II, and II (?). (See Tables 14, 16, and 17 for explanations.)

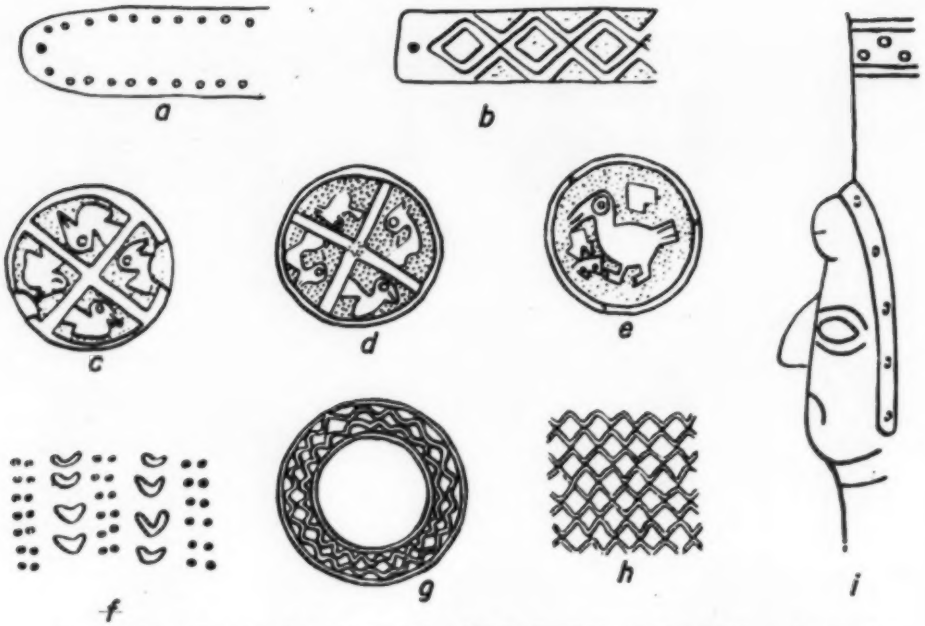

FIG. 18. Silver artifacts from Late Chincha I, II, and II (?). (See Tables 14, 16, and 17 for explanations.)

3733A, B (Kroeber and Strong, 1924*a*, Fig. 24, *a*) are copper earplugs in the form of a ring, possibly cast.

3744 (Figs. 17, *r;* 18, *c*) is a copper earplug. The face is fastened to the ring by crimping the edge of the face over the rim of the ring The design is engraved.

4089A, 4103A (Figs. 18, *b;* 18, *a*) are examples of the 15 headbands found in Late Chincha II graves. They are about 55 cm. long and 2 cm. wide. Many of them are embossed.

LATE CHINCHA II (?)

Site A, three miles north of Tambo de Moro, yielded insufficient pottery to determine its period (Kroeber and Strong, 1924*a*, p. 28). It contained ten objects of silver, six of which are shown in Figures 17 and 18. The analysis of two of them is included in Table 17.

TABLE 15. METAL FROM LATE CHINCHA II

	Gold	*Silver*	*Copper*	*Total*
Site C, Grave 3			6	6
Site C, Grave 4			2	2
Site C, Grave 5		9	12	21
Site F, Grave 1		4	2	6
Site F, Grave 2		4		4
Site F, Grave 3		3	1	4
Site F, Grave 4		7	4	11
Site F, Grave 5		6	2	8
Site F, Crave 6		4	6	10
Total	0	37	35	72

3622 (Fig. 18, *e*) is the silver pan from a pair of scales shown in Kroeber and Strong (1924*a*, Fig. 20). It is engraved with a design on its lower surface. The other pan is not engraved. It is possible that the engraved pan was originally the face of an earplug like 3623.

3623 (Fig. 18, *d*) is an engraved earplug. The face is soldered to the stem.

3624 (Figs. 17, *i;* 18, *g*) is a filagree earplug in the form of a hollow ring. The bent fillet of silver is soldered at every two or three points of contact. The back of the hollow ring is closed with a plain silver sheet. 3625 is of similar form.

These pieces are nicely executed. The site is probably to be assigned to Late Chincha II.

COMMENTS ON LATE CHINCHA METALWORK

The most striking thing about Chincha metalwork is the use of the silver-copper alloy. Copper and silver mix in all proportions when melted, but on solidification one obtains crystals of a silver rich phase (94% Ag) surrounded by eutectic (28% Cu, 72% Ag), if the composition

TABLE 16. ANALYSIS OF METAL FROM LATE CHINCHA II

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Copper		Ear spool	C-3	3730D						6.4 L
Copper		Earplugs (2)	C-4	3733A, B		S	L		Tr	1.0 H, 4.0 D. Kroeber and Strong, 1924*a*, Fig. 24, *a*
Copper		Vessel	C-4	3734	S	L	L	Tr		3.4 D
Copper		Rings	C-5	3741A		L	L	Tr	Tr	2.0 D, 1.7 W
Copper	17, *d*	Tweezers (2)	C 5	3742						5.1 L, 5 W. *Op. cit.*, Fig. 22, *a*, Type 1
Silver	17, *r*; 18, *c*	Earplug	C-5	3744		L	L		Tr	3.8 D, 1.5 L. *Op. cit.*, Fig. 25, *a*
Silver	17, *l*; 18, *h*	Earplug, face	C-5	3746						4.0 D
Copper		Tweezers, fragment	C-5	3749A	Tr	Tr	L	Tr		*Op. cit.*, Type 4
Silver		Tweezers, fragment	C-5	3749B	0	82	18		Tr	*Op. cit.*, Type 5
Silver		Ornament, fragment	C-5	3750	3	92	5		Tr	Soldered wires?
Copper		Parrot	C-5	3751B						2.4 L, 2.1 H. Cast
Silver	17, *s*	Ornament, fragment	F-1	4077	0	66	34		Tr	18 L, 4.8 W
Silver	17, *e*	Tweezers	F-1	4079						5.5 L, 1.4 W. *Op. cit.*, Fig. 22, *h*, Type 6
Copper		Sheet, fragment	F-1	4079B	Tr	L	L		Tr	8 L, 3 W
Silver		Tweezers	F-2	4082	7	69	24			3.4 L, 1.2 W. *Op. cit.*, Type 6
Silver	17, *k*	Earplug	F-3	4083A		L	S			2.5 D, 1.2 L. *Op. cit.*, Fig. 24, *b*
Silver	17, *o*	Earplug	F-3	4083B						2.5 D, 1.2 L
Silver		Tweezers (2)	F-4	4084						4.2 L, 1.9 W. *Op. cit.*, Type 4
Silver	18, *b*	Headband	F-4	4089A						36 L, 1.3 W
Silver	8, *lower right*	Headbands (3)	F-4	4089B	0	60	40			36 L, 2 W
Copper		Head band, fragment	F-4	4089C	S	Tr	L		Tr	
Silver		Wire	F-4	4090						47 L, 3.0 mm. T. Hooks at end
Copper		Earplug, face (?)	F-4	4091						3.6 D. Segment of sphere
Silver	17, *t*	Earplug, face	F-4	4092A	0	73	27			4.8 D. *Op. cit.*, Fig. 25, *c*
Silver		Earplug, face	F-4	4092B						Like 4092A
Silver		Tweezers	F-4	4093						4.3 L, 1.9 W. *Op. cit.*, Type 2
Copper		Needle	F-4	4094						10.3 L
Silver	18, *a*	Headband	F-5	4103A						36 L, 2.0 W
Silver		Headband	F-5	4103B						36 L, 2.0 W
Silver		Headband	F-5	4104		L	S		S	36 L, 2.9 W
Silver		Wire	F-5	4105						29 L, 3 mm. T. Hook at end
Silver	17, *f*	Tweezers	F-5	4106A						4.8 L, 2.6 W. *Op. cit.*, Fig. 22, *m*; Type 9
Silver		Tweezers	F-5	4106B						4.4 L, 3.2 W. *Op. cit.*, Type 7
Silver		Disc	F-5	4108		S	L		Tr	5.5 D
Silver		Headband	F-6	4125	0	64	36	Tr	Tr	43 L, 1.3 W
Copper	17, *p*	Earplug	F-6	4126A						4.7 D. Ring type
Copper	17, *q*	Earplug	F-6	4126B						4.7 D. Ring type
Copper		Earplug, face	F-6	4127						5.0 D
Copper		Earplug	F-6	4128						2.0 D, 1.2 L. Spool type
Silver		Disc	F-6	4129						4.2 D
Silver	17, *g*	Tweezers	F-6	4130A						5.0 L, 1.5 W. *Op. cit.*, Type 6
Silver	17, *h*	Tweezers	F-6	4130B						4.5 L, 1.8 W. *Op. cit.*, Fig. 22, *g*; Type 5
Copper		Band (?)	F-6	4132						11.0 L, 0.7 W. Hook on end
Copper		Head band, fragment	F-6	4133		L	L		Tr	3.5 W

TABLE 17. ANALYSIS OF METAL FROM LATE CHINCHA II (?)

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver	18, *e*	Balance pan	A	3622						3.5 D. Kroeber and Strong, 1924*a*, Fig. 20
Silver	18, *d*	Earplug, face	A	3623						3.7 D. Soldered
Silver	17, *i*; 18, *g*	Earplug	A	3624						4.4 D. Soldered. Ring type
Silver	17, *m*; 18, *g*	Earplug	A	3625						4.4 D. Soldered. Ring type
Silver		Earplug	A	3626						3.2 D, 0.9 T. Ring type
Silver		Armlet (?)	A	3627	0	88	12			9 L, 4 W. Embossed
Silver	17, *a*	Tweezers	A	3629						5.7 L, 2.7 W. *Op. cit.*, Type 3
Silver	17, *b*	Tweezers	A	3629						2.9 L, 1.3 W. *Op. cit.*, Type 5
Silver		Wire, heavy	A	3629						35 L, 2.5 mm. T. Hooks on end
Silver		Disc	A	3636	0	80	20		S	6 D

of the melt lies between 72 and 94 per cent silver; or crystals of a copper-rich phase (84% Cu) surrounded by eutectic (28% Cu), if the composition of the melt lies between 28 and 94 per cent copper. The eutectic consists of a mass of very small crystals of the silver-rich and copper-rich phases mixed together. Pure silver melts at 778°C. The eutectic is harder than either pure metal. This property of segregation on solidification makes silver-copper alloys very difficult to cast. It also gives objects made from the alloy a curious mottled appearance, as though they were made from copper and silver hammered together. When hammered the crystals of the two phases are flattened and the sheet of alloy has a streaky appearance.

A photomicrograph of a headband of the Late Chincha II period (4089B), made of an alloy containing 60 per cent silver and 40 per cent copper is shown in Figure 8, *lower right*. Cohen writes "This photomicrograph was taken of specimen 4089B after etching with chromic acid. There is a dark etching copper-rich phase in this alloy and a light etching silver-rich phase, both of which have been streaked out in the direction of flow by some form of cold-working process, probably hammering. The copper-rich phase has been subjected to corrosion attack, while the silver-rich phase has been little affected. The banded structure in general is quite indicative of severe plastic deformation."

INCA PERIOD

Metal from the Inca period is found at numerous sites in the region of the southern coast. In addition to material from Chincha and Ica, the Uhle collection contains scattered objects from Cochahuasi near Pisco, sites near Nasca, and sites in the Acari and Chala valleys to the south. These are without doubt of Inca origin.

ICA SITES

Of the five graves, four contained metal. (Table 18). These are illustrated in part in Figures 19, 20, and 21 and the analyses are given in Table 19.

Most of the gold is of the silver-rich type. The earplug (5056A) is probably made of an artificial alloy. The silver is of the usual type. The pendant (5060A) is probably made of the silver-copper alloy.

None of the objects seems to have been cast. 5047 is a plume holder fastened together with gum. Several earplugs are fastened with gum or solder. There is no filagree or inlay work, or gilding. The material is much more like Late Ica work than highland Inca.

TABLE 18. METAL FROM INCA (ICA)

	Gold	*Silver*	*Copper*	*Total*
Site T, Grave d, 8	7	7	1	15
Site T, Grave i, 5	4	7		11
Site T, Grave k		1		1
Site T, Grave l	2			2
Totals	13	15	1	29

The most interesting of the objects were found in Grave d, 8 of Site T. Uhle writes of this site (Kroeber and Strong, 1924*b*, p. 126), "Apparently robbed anciently. . . . The grave was that of one of the leading persons in the valley during the Inca dominion." This grave contained the three ceremonial staffs or "pad-

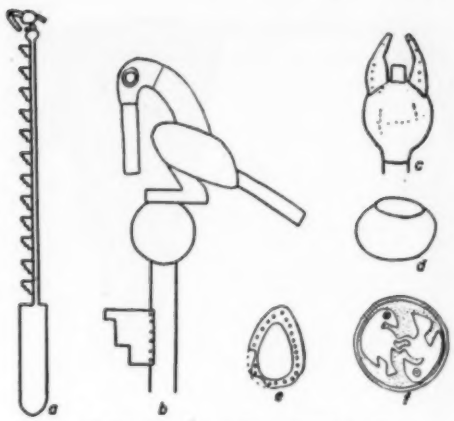

FIG. 19. Metalwork from Ica and Chincha-Inca. (See Tables 19 and 21 for explanations.)

dles" (5013, 5014, 5015 B; Figs. 19, *a*, *c*; 20, *b*). The staff in each case is covered with a thin silver sheet tacked down with silver or copper tacks. Each staff is surmounted by a wooden ball, and then a wooden bird (perhaps only the legs remain in 5014). The ball and bird are covered with sheet gold tacked down in a rather untidy fashion. One staff (5013) has step like projections alternately covered with gold and silver foil.

Site S, Grave 6 is of uncertain period. It contains a cast solid copper club head (4896; Fig. 21, *j*) of Inca style.

CHINCHA SITES

Of fifteen graves three contained metal (Table 20). Some objects are illustrated in Figure 20 and the analyses are included in Table 21.

TABLE 20. METAL FROM INCA (CHINCHA)

	Gold	*Silver*	*Copper*	*Total*
Site E, Grave 7			2	2
Site E, Grave 12		2		2
Site E, Grave 13	2	20	6	28
Totals	2	22	8	32

The metal from Inca graves at Chincha shows few features of interest. Several objects

TABLE 19. ANALYSIS OF METAL FROM INCA (ICA)

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Copper	21, *j*	Club head	S-6	4896						13.5 D
Silver		Paddle, tacks	T-d, 8	5013	3	93	4			
Gold	19, *a*	Paddle, sheathing	T-d, 8	5013	70	25	5	Tr		190 L. Frets 5.8 W
Gold	19, *b*; 20, *a*	Paddle, bird	T-d, 8	5013A	69	24	7			16 H
Gold	19, *c*	Paddle, sheathing	T-d, 8	5014	63	24	13			Ball 7.0 D
Gold	20, *b*	Paddle, bird	T-d, 8	5015B	63	30	7			Bird and ball 8.4 L
Gold	20, *c*	Plume holder	T-d, 8	5047	71	23	6			7.2 H, 3.5–1.8 D
Gold	20, *d*	Bell (?)	T-d(?), 8	5047A						1.6 D, 2.4 L
Copper	21, *m*	Bell	T-d, 8	5049						5.2 L, 4.5 W
Silver		Sheet, fragment	T-d, 8	5053		L	Tr		Tr	6.5 L, 5 W
Gold		Earplug, face	T-d, 8	5056A	50	40	10			3.4 D
Gold		Earplug, face	T-d, 8	5056B						3.4 D
Silver		Pendant, fragment	T-d, 8	5060A	0	82	18		Tr	4.5 L, 3 W
Gold	20, *e*	Disc, fragment	T-d, 8	5062	70	18	12			3 L, 2 W, 0.08 mm. T
Silver		Earplug	T-d, 8	5066						3.4 D. Stem 1.5 D, 1.6 L
Silver		Earplug, fragment	T-d, 8	5067		L	S		Tr	Stem type
Gold	20, *f*	Disc	T-i, 5	5330	66	27	7			9.8 D
Gold	20, *g*	Disc	T-i, 5	5331						9.8 D
Gold	20, *h*, *i*	Pendants (2)	T-i, 5	5332						4.3 L, 2.4 W, 0.16 mm. T
Silver		Earplugs (6)	T-i, 5	5355A, B, C						3–5 D, 2–2.5 L. Stem type
Silver		Plume holder	T-i, 5	5356	0	89	11			4.5 L, 2 W
Silver	19, *e*	Pendant	T-i, 5	5357A	0	89	11		Tr	6.4 L, 4.3 W
Silver		Discs (2)	T-k	5412	0	88	12			2 D. Sewn on cloth
Gold		Disc	T-l	5435						1.6 D. Sewn on cloth

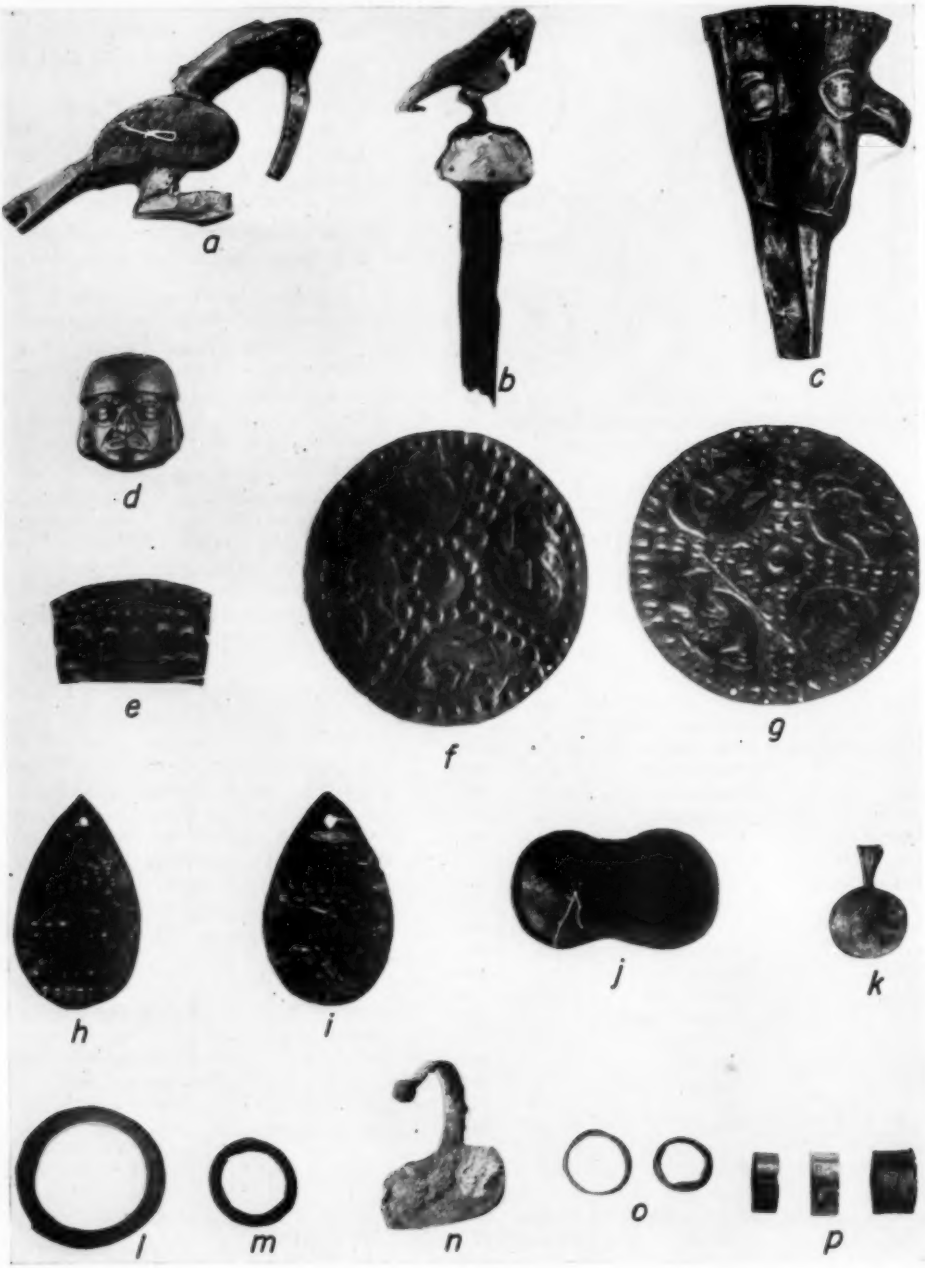

FIG. 20. Metalwork from Ica and Chincha-Inca. (See Tables 19 and 21 for explanations.)

TABLE 21. ANALYSIS OF METAL FROM INCA (CHINCHA)

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Silver	20, *j*	Dish	D	3843						11.2 L
Silver		Armlet	D	3843A		Tr	L			7 L, 5.5 W
Silver	20, *e*	Earplug	D	3844A		L	L		Tr	4.0 D. Ring type
Silver		Earplug	D	3844B						3.0 D. Ring type
Silver	20, *m*	Earplug	D	3844C						1.9 D. Ring type
Silver		Rings (3)	D	3845A, B, C						1.8 D, 1.0 H
Copper		Tweezers	D	3847						Kroeber and Strong, 1924*a*, Type 3
Copper		Tweezers	D	3848						*Op. cit.*, Type 5
Copper		Needles (4)	D	3867						10.0 L. In tube
Silver		Toy vessel	E-12	3965						3.7 L
Silver	20, *k*	Tweezers	E-12	3966A						3.9 L, 2.7 W. *Op. cit.*, Fig. 22, *j*; Type 7
Silver	19, *e*	Jar	E-13, 2	3974A		L	L		Tr	6.3 D, 3.6 H
Silver		Tweezers	E-13, 2	3976A						3.8 L, 2.4 W. *Op. cit.*, Type 2
Silver		Fragment of sheet	E-13, 2	3984C	0	91	9			4 L, 2 W
Silver	19, *f*	Earplug, face	E-13, 3	3986	25	16	59			3.8 D. *Op. cit.*, Fig. 25, *b*
Copper	20, *n*	Knife	E-13, 3	3987		S	L			8 L, 5.5 W. *Op. cit.*, Fig. 26
Silver	20, *o*, *p*	Rings (11)	E-13, 3	3988						1.8–2.0 D. Two are copper
Gold		Armlet (?)	E-13, 4	3995	81	19	0			14 L, 8 W, 0.47 mm. T
Gold		Tweezers, fragment	E-13, 4	3996	76	23	1			
Copper		Tweezers	E-13	4007						3.7 L, 1.5 W. *Op. cit.*, Fig. 22, *b*; Type 2

are cast. Some are welded or soldered.

3986 (Fig. 19, *f*) is an earplug with the edges of the silver face crimped down over a cast copper ring.

3995 is a folded piece of sheet gold. It has no decoration. The ends are fastened together by a cord.

Site D at Chincha contained half a dozen pieces of pottery of both Late Chincha I and the Inca period (Kroeber and Strong, 1924*a*, p. 28). The four silver and three copper pieces are rather commonplace. The tweezers and earplugs resemble those of Late Chincha I. A miniature dish with a constricted middle is probably Inca. The metal thus agrees with the pottery. Site D seems to be a Late Chincha I site with intrusive Inca material.

MISCELLANEOUS SITES

The remaining Inca sites have yielded the following materials:

TABLE 22. ANALYSIS OF METAL FROM INCA (MISCELLANEOUS)

Color	*Figure*	*Object*	*Site*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Copper	21, *e*	Bell (?)	Cochahuasi	8043		Tr	L	S		3.2 L, 1.6 D
Copper	21, *c*	Bell	Cochahuasi	8044		Tr	L	S	Tr	3.4 L, 1.2 W
Copper	21, *b*	Staff head	Cochahuasi	8045						2.5 H, 1.2 D
Copper	21, *d*	Tortoise	Cochahuasi	8046		Tr	L	S		2.4 W. Cast
Copper		Disc	Cochahuasi	8046A		Tr	L	S		2.0 W, 1.7 H
Copper	21, *f*	Knife	Chavina	8161						11.6 L, 14.5 W
Copper	21, *l*	Bell	Jaqui	8305						2.7 H, 3.4 H
Copper		Club head	Chala	8317		Tr	L	S		9.5 D, 3.6 H. Like 8323
Copper	21, *k*	Club head	Chala	8323		Tr	L	S		7.7 D, 2.4 H
Copper	21, *a*	Ear spool	Poroma	8454						8.5 L
Copper	21, *h*	Axe	Trancas	8611						8.9 L, 3.8 W
Copper	21, *g*	Axe	Trancas	8612						10.5 L, 2.5 W
Copper	21, *i*	Axe	Nasca	8790						13.4 L, 8.9 W

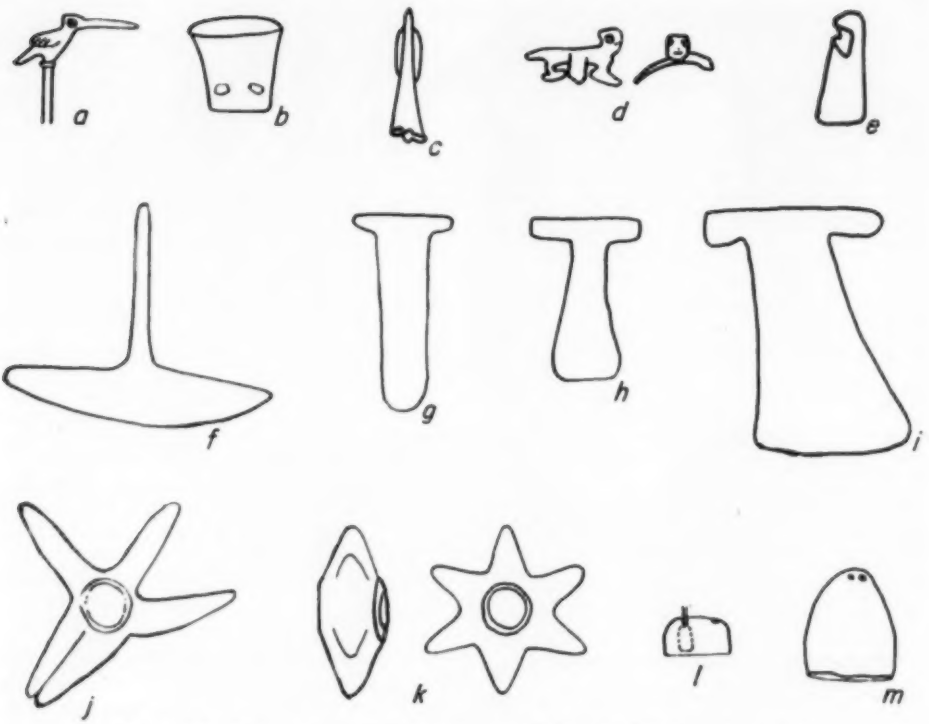

FIG. 21. Miscellaneous Inca copper and bronze. (See Tables 19 and 22 for explanations.)

8046 (Fig. 21, *d*) is a cast tortoise, shaped so as to fit on a staff. It is from Cochahuasi, on the road to Pisco.

8790 (Fig. 21, *i*) is a heavy cast copper axe head from Nasca.

8454 (Fig. 21, *a*) is a copper ear spoon from Poroma, near Nasca. It is nicely cast.

8611 and 8612 (Fig. 21, *h*, *g*) are cast copper axes from Trancas, in the Quebrada of Tunga, five leagues from Nasca.

8161 (Fig. 21, *f*) is a cast copper knife from Chavina, valley of Acari.

Several copper needles, bell, etc., were found at Jaqui (Fig. 21, *l*).

8317, 8323 (Fig. 21, *k*) are cast bronze club heads from Chala.

All of these metal objects are of copper or bronze, many are cast, and all are of Inca workmanship. They in no way resemble the work of the coast. They were probably made in the highlands.

OBJECTS OF DOUBTFUL ORIGIN

In Table 23 are given six analyses of objects from the Chincha Islands and Ica. They are from various American collections. Nothing is known of the conditions under which they were found.

N.M. 12233, an embossed sheet of silver obtained by W. W. Evans in 1873 from the burial place, Guanera Island, South Chincha Islands, is probably Late Chincha II. This would indicate contacts between the islands and the mainland about 1350 A.D. or later, according to the absolute dating of Kubler (1948, p. 39), based on the guano deposits, if we assume that the silver fish (*op. cit.*, Fig. 19) are Late Ica or Chincha as they seem to be.

CHANGES IN STYLE

The frequency of some of the types of objects and elements of design are shown in Tables 24 and 25. The number of examples is given in each case.

These tables confirm in the main the changes in style found in the pottery. For example, Late Ica I has many more objects decorated in a

TABLE 23. ANALYSIS OF MISCELLANEOUS METAL

Color	*Object*	*Collection*	*Cat. No.*	*Au*	*Ag*	*Cu*	*Sn*	*Pb*	*Remarks*
Gold*	Ring	Harvard Peabody Museum	7281	L	L	L	S		2.0 D, 1.2 H
Gold*	Earplug	Harvard Peabody Museum	7282	L	L	S	Tr		4.0 D
Silver†	Sheet	U. S. National Museum	12233	0	40	60			15 L, 6 W. Embossed fishes
Gold‡	Ornament	American Museum of Natural History	B-9600	100	0	0			3.0 L, 2.4 W. Embossed
Gold‡	Strip	American Museum of Natural History	B-9602	98	2	0			7.7 L, 0.7 W, 0.08 mm. T
Gold‡	Discs (15)	American Museum of Natural History	B-9604	56	37	7			4.5 D, 0.30 mm. T

* Chincha Islands. Collected by Agassiz, 1872.
† South Chincha Islands, Guanera Island burial place. Evans Collection, 1873.
‡ "Ica." Bandelier Collection.

geometrical style (fret, diamond, chevron, etc.) than Late Ica II. The detailed analysis of these tables I will leave to others.

THE DEVELOPMENT OF METALLURGY AT ICA

In Table 26 are summarized the use of various metals and processes in the region of the southern coast of Peru. These data may be interpreted as follows.

The first inhabitants of the southern coast of Peru, in the early centuries of the Christian era if not earlier, obtained native gold from the neighboring mountain streams and hammered it into thin sheets. The sheets were cut into small rectangles to be sewn to clothing, head ornaments, and similar objects. These were embossed with raised lines and dots, and then heated to a dull red heat to relieve strains.

Several hundred years later the center of culture was in the region of Nasca, but the metal workers still carried on the earlier practices.

TABLE 24. FREQUENCY OF TYPES

	ICA				*CHINCHA*		
	Middle II	*Late I*	*Late II*	*Inca*	*Late I*	*Late II*	*Inca*
Dish: plain		1	1		2		
Dish: geometric		6					
Dish: fish or bird		3					
Dish: cat			4				
Beaker: plain		1	5				
Beaker: geometric		4					
Beaker: fish, bird							
Beaker: cat							
Cup: effigy		5	5		2		
Cup: terraced			3				
Large hollow beads	13						
Earplug: spool	1	1	2		3	3	
Earplug: mushroom		5	6	8		6	
Earplug: ring						7	
Tweezers: hourglass, etc. (Types 3, 4, 9 of Kroeber and Strong, 1924*a*, p. 40)	1	4		1	4	4	1
Tweezers: circular (Types 7, 8 of *op. cit.*, p. 40)	1	1			2	4	1
Tweezers: triangular, etc. (Types 7, 8 of *op. cit.*, p. 40)						7	4

TABLE 25. FREQUENCY OF DESIGNS

	ICA				CHINCHA		
	Middle II	*Late I*	*Late II*	*Inca*	*Late I*	*Late II*	*Inca*
Rows of small dots	4	18	9	4	3	6	
Large dots (5 mm.)	1	10*	4	1			
Raised line		2	1		2		
Geometric (diamond, fret, etc.)		3	2	1	1	1	
Crosshatching		4	3				
Chevron		3		1	1		
Cluster of dots	1	3		1			
Stippled background			1			5	1
Bird design	3	3		2		3	1
Fish design			1	2		1	
Cat design			5	2		1	

* In six cases these border the lower edge of silver dishes; see Figure 16, *f*.

They had added one new process, soldering. They were not very skillful at soldering and seldom used it. Objects were still made from sheet gold, and were not very large in size.

During this period their contemporaries in the Chimu region on the north coast were making exceedingly complex castings of copper and gold, were doing delicate soldering, were gilding sheets of copper, and were even making objects of two metals.

The incursion of the highlanders during the Tiahuanaco period seems to have added nothing to the Nasca knowledge of metallurgy. In fact, for 200–300 years metal was little used and by the Middle Ica period, when metal had once more become abundant, the older forms had almost disappeared.

Some time about 1200 A.D., fairly large quantities of gold, silver, and copper became available to the inhabitants of the southern coast. The objects of metal were now of larger size and in greater variety. Cuffs, armlets, large discs, and masks were manufactured. Favorite decorations were rows of small dots, and the stylized figure of a bird. The processes used were the same, but the spirit was very different. The source of this new spirit may have been the middle coast in the region of Lima.

TABLE 26. DEVELOPMENT OF METALLURGY

	Paracas	*Nasca*	*Early* Ica*	*Middle* Ica I*	*Middle Ica II*	*Late Ica I*	*Late Ica II*	*Inca*
Gold	x	x			x	x	x	x
Silver					x	x	x	x
Copper		?	?		x	x	x	x
Au-Ag					x	x	x	x
Ag-Cu					x	x	x	x
Bronze							x	x
Hammering	x	x			x	x	x	x
Embossing	x	x			x	x	x	x
Engraving	x	x			x	x	x	x
Annealing	x	x			x	x	x	x
Casting		?			?		x	x
Soldering		x			x	x	x	x
Welding							?	x
Gilding								

* Little, if any metal in use.

In the next 200 years the metal workers of Ica grew sufficiently competent to be able to hammer out large dishes, beakers, and cups from single sheets of metal. An alloy of gold and silver was increasingly used. Often these were decorated with geometrical designs or, as in earlier times, rows of small dots or figures of birds. Often the cups were made to resemble a human head, beaten out perhaps over forms of wood as they were at Ancon and Pachacamac. The work was not very carefully done. The embossed birds were of doubtful shape, and the lines of dots were not always straight. The general effect, however, was a very pleasing one.

In Chincha during this time the work was less massive but of better quality. Incised designs and stippled backgrounds were sometimes used, and there were some unique objects made of a semi-filagree. A silver-copper alloy became popular.

The Inca conquest about 1400 A.D. modified but did not fundamentally change the use of metal in the Ica region. The cat or fish was sometimes used in place of the earlier bird in the ornamentation of dishes and pendants. Carved wooden "paddles" of intricate design were covered with gold and silver foil. But still no objects were cast nor bronze used as in the highlands. Inca workmen apparently stayed in their mountains, and the craftsmen of the coast continued much as before, until the arrival of the Spaniards in 1534 put an end to their operations.

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Department of Chemistry
Bowdoin College
Brunswick, Maine
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THE LAKE SPRING SITE, COLUMBIA COUNTY, GEORGIA

CARL F. MILLER*

WHILE making an archaeological survey of the Clark Hill Reservoir area in eastern Georgia and western South Carolina, the writer located an apparently undisturbed shell deposit, the Lake Spring site (9 Cu 61), which is situated 5 miles east of Pollards Crossroads, Columbia County, Georgia, on the south bank of the Savannah River about 1.5 miles upstream from the construction area of the Clark Hill dam and just west of Lake Spring Creek. It is a fairly large site with a deep midden of shells and other occupational refuse.

This can be ranked as the major site of the Clark Hill Reservoir basin. It occupies an area roughly 400 feet long and about 150 feet wide, and has only superficially been disturbed by plowing. The cultures represented are more or less intact.

Lake Spring site is the only excavatable one of its type in the basin which can be attributed to the Archaic[1] horizon. It is located near the eastern extremity of a long, low ridge about 2 feet in height. When first sighted a portion of the ridge was covered with pulverized shell and a few artifacts, such as projectile points and a sherd or two. This whole appearance suggested an affiliation with the culture found on Stalling's Island, which is located farther down the Savannah River in the vicinity of Big Stevens Creek and is the only other site of comparable description.[2]

Testing at the Lake Spring site showed a well-defined superposition of two distinct occupations, comparable to those at Stalling's Island. The first is represented by a rather full complement of artifacts, which apparently have accumulated over a long period of time. Net sinkers of perforated slabs of steatite, grooved steatite nodules, together with other distinctive stone, bone, and antler artifacts, all delimit this occupation.

Subsequently, the art of pottery-making was introduced in the form of a fiber-tempered ware, relatively simple in shape and type of decoration. This pottery is quite homogeneous in paste, temper, color, surface finish, and shape. There is apparently no marked differentiation in decorative types throughout the pottery-bearing levels.

As Claflin,[3] Fairbanks,[4] and Caldwell and Waring[5] have pointed out, the sites with this sequence on the Savannah River and portions of South Carolina and Georgia are the earliest yet known in the area. They are assigned to the Lower Archaic Pattern, Stalling's Island Aspect, Savannah River Focus.

Fairbanks[6] at one time suggested that the Savannah River Focus be included with the Lauderdale Focus of northern Alabama and the Indian Knoll Focus of Kentucky in a "Shell Mound Aspect." However, Webb[7] has placed the Lauderdale and Indian Knoll together in a "Pickwick Aspect."

Stalling's Island, the type site, is located in the Savannah River 8 miles above Augusta, Richmond County, Georgia, on which is a deep deposit of shell and other midden material. This deposit has been tested by Jones,[8] Claflin,[9] and Fairbanks,[10] and a trait list has been complied by Fairbanks, showing the taxonomic position of the site.

Claflin has listed eight Stalling's Island culture sites, the northernmost being located near the foot of Germain (Walton's) Island. Jones[11] mentioned another at the mouth of Great (Big) Kiokee Creek, Columbia County, Georgia. Griffin[12] has pointed out that sherds of a fiber-

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[1] The choice of this term is lamentable in that it deals with cultures which were believed to come into existence around the beginning of the Christian Era, not allowing for much earlier cultures which are known to have existed in the area prior to this time. The use of "Non-ceramic," or any other suitable term, would be much better than that now in use. For those periods in which ceramics have developed, a name such as "Early Ceramic" would designate the true picture, since chronological studies are based almost solely upon pottery types.

[2] Claflin, 1931.

[3] Claflin, *op. cit.*

[4] Fairbanks, 1942.

[5] Caldwell and Waring, 1939.

[6] Fairbanks, *op. cit.*

[7] Webb and DeJarnette, 1942.

[8] Jones, 1873.

[9] Claflin, *op. cit.*

[10] Fairbanks, *op. cit.*

[11] Jones, *op. cit.*, pp. 200, 339, 340.

[12] Griffin, 1943, p. 164.

tempered ware were found in Wilkes County, Georgia, a fact which throws additional light on the extension of this culture northwest of the Lake Spring site.

The recent survey located two additional sites:

1. Lake Spring site.
2. A site about a quarter mile upstream on Little River, Georgia, where State Highway 47, leading southwards to Augusta, crosses the river. This site has been denuded by flood action and very little of the original deposit remains intact.

EXCAVATIONS

Lake Spring site was tested in two places. A 10-foot square test pit, "A," was put down near the southern edge of the site, while a second pit, "B," 5 feet square, was put down 70 feet north of Pit A. Both pits were driven well into undisturbed subsoil, which proved to be a former sand bar laid down earlier by the Savannah River. This sand bar lies parallel to the river bank and is about 150 feet away from the river's present edge.

The site, which has been cultivated for quite some time, lies in an open pasture. Slight evidence of furrows is still to be seen on the surface.

A layer of humus and alluvial material, varying in thickness from 1 foot to 1 foot 5 inches, lay above the undisturbed shell deposit. Within this stratum, which has been mixed somewhat by deep plowing, were a number of river-worn, cracked, or broken stones, quartz chips of varying sizes, aplite projectile points, sherds of the type usually associated with the Stalling's Island culture, and bone fragments.

After the undisturbed shell deposit was reached it was taken down in 6-inch horizontal levels. All stone, regardless of whether it was worked or not, was saved and later examined. This also applied to the bone and antler material. Occasionally pockets of extraneous balls of clay were found, apparently cached by some former resident. This clay may have been used as body paint, as some of the balls contained yellow ocher while in others an orange tint indicated the possible presence of iron salts. On the whole, the deposit was a heterogeneous mass with artifacts and refuse mixed indiscriminately.

Testing showed that the early inhabitants settled on a low sandy ridge paralleling the river and there built up this mass of debris. Later, apparently after quite a lapse of time, the site was abandoned. A later group occupied the site for a short time sufficient for them to intrude pits into the shell deposit, from which a few of their sherds were found. Later the river deposited a mantle of alluvial material, which was undisturbed until white man cultivated the site. The origin of the late pits are traceable up to the top of the shell deposit and the bottom of the alluvial material.

INTRUSIVE POTTERY

Of the extraneous sherds recovered from the intrusive pits, two resemble types attributed to the Lamar culture, two resemble types of the Deptford culture, while the remaining sherds are all plain surfaced and sand tempered. As Caldwell[13] has stated, practically nothing is known about the people who lived on the Georgia coast during the Deptford period. Waring,[14] during his Bilbo excavations, found sand-tempered sherds of the Deptford horizon with some simple-stamped tetrapodal supports in the upper levels of the site, overlying fiber-tempered pottery. A fragment of a simple-stamped tetrapodal support was found in the humus-alluvial layer of this site.

Caldwell goes on to say:

> We have already seen that Deptford sherds were restricted to the upper level of Bilbo. In a stratigraphic pit at Deptford some Stalling's Island-like sherds were found at the bottom. The length of time between these two horizons is not known but the gross difference between the fiber-tempered, non-coiled, non-paddle stamped simple bowls of the Savannah River Focus, and the sand tempered, coiled jars and elaborate stamped decoration of Deptford, are far greater than between any two successive complexes in the area. There are some hints of transition in certain of the pottery from Stalling's Island, in the Thom's Creek series of South Carolina and in the fiber and sand tempered potteries of northern Alabama. Recent work by Waring near the mouth of the Savannah is expected to clarify this.
>
> Potteries resembling the major Deptford types occur at sites on the Georgia and South Carolina coasts and on the northwest coast of Florida (Willey and Woodbury, 1942, pp. 240–1). In interior Georgia, northern Alabama, and eastern Tennessee there are other early stamped potteries which resemble the Deptford types to a lesser degree.

INDIGENOUS POTTERY

No conclusions could be made regarding the distribution of the indigenous, Stalling's Island

[13] Caldwell, n. d.
[14] Griffin, 1943, p. 164.

types. The same types are found throughout the pottery-bearing zone. As pointed out above, no sherd material was found below a depth of 2 feet 11 inches, which means that all pottery was confined to the first, second, and third 6-inch levels, if we disregard those found in the disturbed humus-alluvial layer above the shell deposit (Table 27).

The largest number of sherds were found in the first, uppermost, level with a marked decrease in number in each of the two succeeding levels. Stone and bone artifacts continued to a depth of 5 feet, and it is therefore certain that the art of pottery-making was not introduced until late in the period of occupation (Table 27).

TABLE 27. DISTRIBUTION OF ARTIFACTS AT THE LAKE SPRING SITE

	Surface to 1'5"	*1'5" to 1'11"*	*1'11" to 2'5"*	*2'5" to 2'11"*	*2'11" to 4'11"*	*Test Pit B*	*Total*
POTTERY:							
Stalling's Plain	9	69	35			14	127
Stalling's Punctate	8	14	6			21	49
Deptford	2						2
Lamaroid		3					3
Plain, sand tempered	8	4	6	3			21
STONE:							
Waterworn, broken, cracked	118	634	485	362	302	276	2177
Chert (aplite) chips		23	108	479	356	73	1039
Quartz chips	27	325	60	13	31	36	492
Flint chips		7	1		25	2	35
Slate chips		1					1
Atlatl weights					2		2
Winged drills		2	1		2		5
Cruciform drills							
Straight drills				2			2
Steatite net-sinkers, perforated slabs		1	2	9	27		39
Steatite nodules, pitted					1		1
Steatite nodules, notched					1		1
Steatite fragments		3	3	2	2		10
Aplite projectile points	7	12	8	12	12	7	58
Aplite projectile points, fragments			2	40	52		94
Aplite turtlebacks					1		1
Aplite flake graver					1		1
Aplite crescent-shaped scraper					3		3
Aplite worked chips (knives)			2	9			11
Quartz projectile points		17	4		1	6	28
Quartz projectile points, fragments			1	1			2
Quartz turtlebacks			1	3			4
Quartz hammerstones			1				1
Flint projectile points		1		2			3
Flint nodules					2		2
Flint scrapers				1			1
Discoidals		2	2				4
Axe, crude, chipped	1						1
Axe, three-quarters grooved	1						1
Hammerstones		1			1		2
Manos					1		1
Bone tools		4	5	3	2		14
Bone projectile points		1					1
Bone fragments	20	378	272	262	260	176	1368
Antler fragments		4	7	4	8	3	26
Antler projectile points					1		1
Burned clay nodules				9	7		16

All of the indigenous pottery is tempered with fibrous material. Occasionally small particles of sand or mica flakes are present in the paste, but these are accidental and were not purposely placed in the aplastic.

The discussion of the plain pottery follows the method of description outlined in the *News Letter, Southeastern Archeological Conference.* A more detailed particularization of the decorated sherds is then given.

Type name: Stalling's Plain.

Construction: Generally considered to have been molded, but there is a faint suggestion of coiling.

Paste: Temper is of vegetal fibers; texture medium; hardness 2.0 to 2.5. The majority can be scratched by the finger nail. Color of the core is nearly always a dark gray to black, with a lighter, narrow oxidized surface layer. Exterior surfaces range in color from yellows through chocolate browns.

Surface finish: Exterior and interior surfaces are roughly smoothed. They have a vermiculated appearance because of the use of oxidized fibrous matter as tempering material; and, occasionally a laminated appearance, as though the walls of the vessel had been built up at intervals.

Decoration: None.

Form: Vessel forms are confined to bowls of the *cazuela* type, which are comparatively shallow with wide mouths and rounded bottoms. Portions of two bowls show that the diameters range from 20 to 30 cm. or more. Wall thickness ranges from 4 mm. to 20 mm., with the average being around 9 mm. Rims are usually vertical; lips, rounded and narrowed with only an occasional flattened example.

Usual range of type: Claflin mentioned Stalling's Island and a few related sites. Jones notes a similar site at the confluence of Great (Big) Kiokee Creek with the Savannah River. Waring found similar material at the Bilbo site. Holder[15] obtained fiber-tempered wares on or near St. Simons Island, Georgia. Kelly[16] describes similar wares from the Macon area. Griffin[17] reports on sites at Beaufort, South Carolina and from Wilkes County, Georgia. Haag[18] mentions fiber-tempered sites in northern Alabama.

Chronological position of type in range: This is the first pottery type at Stalling's Island, Lake Spring, Bilbo, Big Kiokee, and the Wheeler and Pickwick Basins in northern Alabama. It is also reported from early levels at Savannah and along the Atlantic coast. The consensus of opinion is that it is the earliest in the Southeast.

Plain ware is in the majority, being represented by 128 sherds, while only 44 sherds are of the various Stalling's Island decorated types (Fig. 22). This is an insufficient number to be used for statistical treatment.

The decorated sherds found at Lake Spring site verify Claflin's statement that:

> The decoration on Stalling's Island pottery is unique and differs entirely from any of the repeated forms of decoration occurring on Southeastern ware. With the exception of rough scratches, the decoration is punctated. With the aid of a small implement, possibly only a stick, the potter punched the desired pattern into the soft surface of the vessel. As a rule, line after line of the impression of the tool in hand covers the surface of the vessel, the impressions often so near together that they form little corrugated trenches. Sometimes the individual taste of the potter varied the direction of the corrugated trenches so that more complicated patterns resulted (p. 16).

The decoration occurs in two places: on the flattened lips and on the exteriors of vessel walls. On the lips it usually appears as straight-line incising, made with a fine sharp-pointed instrument placed at right angles to the body of the vessel. The striations are spaced at irregular intervals, ranging from 2 mm. to 5 mm. The strokes appear to have been applied from the outside in, as they are deeper on the outside. Most of the lines become indistinct toward the inner edge of the lip.

In some cases, a rocker-like technique was used in applying the line markings to the rim. A few of these lines appear as though the instrument had a serrated edge, while the majority are straight and simple, moving across the entire width of the lip in a zigzag line.

On vessel exteriors, a number of the Lake Spring sherds are decorated with scratches. Some are broad, haphazard lines roughly drawn parallel to the lip (Fig. 22, *b*); others have been marked with finely drawn crisscross lines with no apparent symmetry (Fig. 22, *c*); while on others the crisscross lines are carefully drawn with a fine-pointed object, forming a diamond-shaped design (Fig. 22, *d*).

The majority of the vessel exteriors, however, are decorated with random or linear punctates. Random punctates are usually oval or semicircular. The linear punctated decoration is effected by drawing a dull-pointed tool across the clay with more or less regular, deeper punches. This forms a trough with vertical, semicircular, or triangular depressions through its length. Such lines are usually horizontal. Meanders (Fig. 22, *h*, *i*) and vertical lines of decoration (Fig. 22, *j-s*) occur less often. Since no whole vessels have been found, it cannot be

[15] Holder, 1938.
[16] Kelly, 1938.
[17] Griffin, 1943.
[18] Haag in Webb and DeJarnette, 1942.

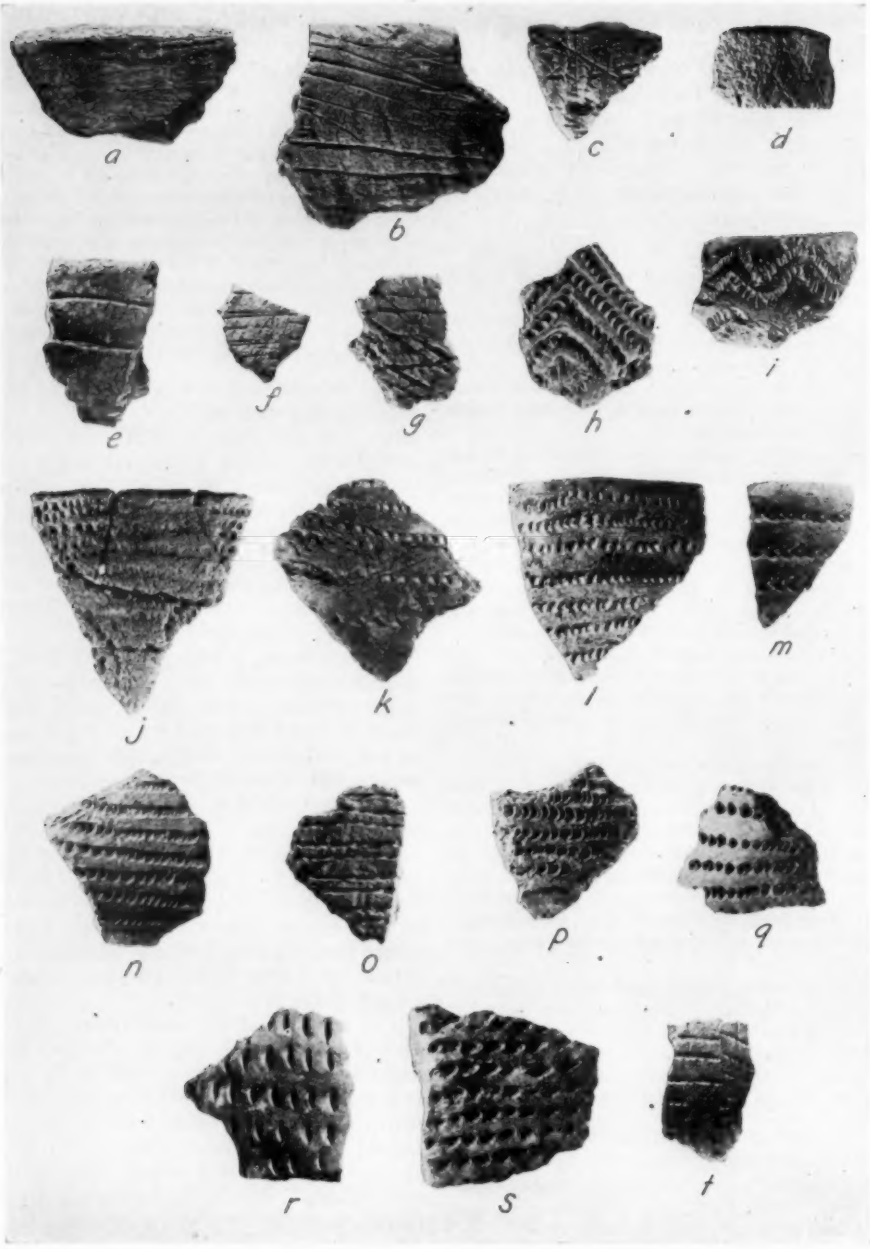

FIG. 22. Ceramic types of the Lake Springs component, Savannah River Focus.

stated with any reliance that the decoration was confined to any specialized zone on the exterior of the vessel.

One sherd found in the upper limits of the deposit displays a type of decoration heretofore not mentioned in relation with this culture, stamping with a cord-wrapped stick (Fig. 22, *l*). The impressions range from 1 mm. to 2 mm. in width and are spaced at irregular intervals 5 mm. to 8 mm. apart.

In general, the characteristics of the pottery are very similar to those described by Claflin and Fairbanks from the Stalling's Island site.

STRUCTURES

While there was no direct evidence of permanent structures or dwellings, a number of burned areas and one fire-basin were found scattered throughout the shell deposit. These burned areas were never very extensive, usually covering an area roughly 3 feet in diameter. The one fire-basin found measured 1 foot 4 inches in diameter. It was surrounded by a burned area varying in width from 7 to 11 inches. No evidence of post molds nor any well-defined floor areas were found.

Scattered throughout the whole deposit were numerous river pebbles, besides other types of stones presumably used in cooking by the "hot rock" technique. It is assumed that these stones were heated and, while still hot, dropped into a container filled with water and foodstuffs. As the rocks lost their heat they were fished out and either used over again or discarded, new ones being substituted.

CHIPPED STONE ARTIFACTS

The use of quartz was practically negligible in the lower levels of the deposit and gradually increased in amount towards the surface. Aplite was used instead in the early stages of habitation. A large number of flakes were recovered, demonstrating a prolonged occupation for the site.

The Stalling's Island culture had a distinctive type of projectile point, the square-stemmed (Fig. 23, *i-o*). Its workmanship is crude. Most specimens appear to have been entirely fashioned with percussion methods; only a few are finished off with pressure chipping. As a variant on the straight or square stem, some points have a slightly concave base (Fig. 23, *j*), but this is less common. A contracting stem is also typical of the culture.

In contradistinction to Claflin it must be stated that the points are not typically "lop-sided." Most are symmetrical in shape with a tendency to be rather large. Only in atypical forms is the base off center, accentuating one shoulder over the other.

It is felt that not all the blades encountered were used as projectile points. Some may have served as knives and possibly as spear points.

There is considerable variation in size. A number of specimens were found to range in length from 50 to 123 mm. and in width from 27 to 80 mm. Aplite, jasper, quartz, and felsite porphyry were used in the manufacture of projectile points, knives, and drills.

Presumably the points were used on atlatl darts and antedate the bow and arrow, but this cannot be said to be a conclusive fact. Other points, such as those manufactured from bone (Fig. 23, *b'*) and antler (Fig. 23, *a'*), were also supposed to have been used with the atlatl thrower and these are comparatively light in weight. Webb,[19] pointing this out in his Indian Knoll report, says:

> This general robustness of the flint projectile point may suggest the use of the atlatl rather than the bow; however, it proves nothing conclusively since many light projectile points were used which were made of bone and antler.

Claflin[20] mentions that:

> Only a very few points were small enough to justify their use as arrowheads, many too crudely fashioned to be of any service whatsoever as the point of a weapon, with the possible exception of being attached to a long arrow for shooting fish. Possibly the atlatl was in extensive use and many of the points 1¼ inches to 3 inches in length were attached to atlatl darts.

Practically every stage of manufacture is represented in the collection. That these artifacts were manufactured in quantities is attested to by the thousands of chips and caches of chips, crude points, and discards which are to be found throughout the deposit.

Three types of drills were found within the village fill: straight-sided, expanded-base (Fig. 23, *s*), and cruciform (Fig. 23, *q*, *r*). Straight-sided drills, as the term implies, have been fashioned from fragments of jasper and aplite into small bars elliptical in cross section and terminating in a blunt point. These drills range in length from 32 to 58 mm. In the expanded-base type, the degree of expansion and its size

[19] Webb, 1946, pp. 251–2.

[20] Claflin, 1931, p. 34.

vary. One expanded-base drill of aplite has a very small projection with a very large base, while those fashioned from jasper and quartz are longer, measuring 28 mm. to 32 mm. with only a moderate degree of expansion at the base. A number of the specimens are covered with small worm cases which give them an "old look and feel."

Three variants of the cruciform drill type have been recovered: (*a*) expanding base with only slight cruciform appearance, (*b*) cruciform with straight stem and square base, and (*c*) cruciform with corner-notched stem and rounded base. All of the specimens of this type are made of felsite porphyry.

A number of sharp pointed tools known as gravers were found, which were intended only to "cut" at the point. Three different types were obtained from the lowest levels of the deposit, each represented by a single specimen. The first type resembles very much a typical Stalling's Island projectile point with the exception that the point has been especially treated and brought more to a point than the average projectile point. This type resembles similar gravers found by Webb[21] at Indian Knoll. The second type is new and has never been described. Out of a fortuitous bluish-black chert chip extends a projection 7 mm. wide and 13 mm. long, which has been brought to a sharp point. This projection was made by pressure chipping and shows a certain amount of secondary chipping especially near the point. The third type has been fashioned out of a fairly large jasper chip. Some rather large flakes were struck from it, shaping it roughly into a crude oval, the edges of which have been finely chipped, leaving a slight "tit" which serves as the graver. The sharp point on each specimen is the one important element in this type of tool.

From the surface of the site a large ovate object of banded slate was recovered. This may be a digging tool of some kind, which probably was left here or discarded by a later group of people.

A trait not recognized heretofore is the utilization of sharp stone chips as possible knives. A fairly large number of stone chips look as though they had been used as knives and had been discarded when they became too dull for the purpose at hand.

[21] Webb, 1946, Fig. 33, *D*.

GROUND STONE ARTIFACTS

The only polished stone objects encountered at the site were two fragments of "bannerstones" or atlatl weights (Fig. 23, *b*, *c*). Both weights were fashioned from serpentine and are of the rectangular variety. The larger of the two is flat on one side and slightly convex on the other. The other weight is represented by only a fourth of the original and probably was rounded-rectangular in general outline with an attached bar-effect on one side (Fig. 23, *c*). The two fragments show a very uniform bore from one end to the other, which probably indicates that the drill used was a cylinder of some kind. A close inspection of the channels shows annular grooves cut into the walls of the bore at very regular intervals of about 1 mm. (Plate 23, *d*). Webb[22] explains this appearance thus:

> The interior surface of some bores have the appearance of a negative impression of a crinoid—so uniform is the spacing of these grooves. This condition could have been attained if a reed drill was used with water in the hole and sand was used for the cutting agent. This would, for the best operation, require periodic cleaning out of the hole and the introduction of fresh sand having a sharp cutting edge. When the sand was fresh and sharp, it would not only cut ahead of the reed as desired, but would also cut into the wall of the bore. As the sand became less sharp, the cutting continued, only under the reed, where there was sufficient pressure. If this be a reasonable interpretation, the number of these rings may indicate how many times the workman cleaned out the hole and introduced new sand.

Only three discoidals were found. One measuring 62 mm. in diameter and 24 mm. in thickness, is well smoothed and carefully shaped (Fig. 23, *g*), and was probably a "chunkee" stone. Very slight central depressions are found on either side; outside of a few broken areas, which are present on either side, the specimen is almost perfect. It has been fashioned out of diorite, a relative hard stone, and shows no use as a hammerstone. One crudely shaped quartz discoidal shows some use as a hammerstone. It measures 70 mm. in diameter and 40 mm. in thickness. Its base is comparatively flat with the opposing face slightly convex. A third specimen, of badly disintegrated micaceous schist, measures 100 mm. in diameter. Its original thickness cannot be stated as the specimen is badly weathered and presents a biconvex appearance at the present time.

A number of "patella-shaped" stone objects

[22] Webb, *op. cit.*, p. 269.

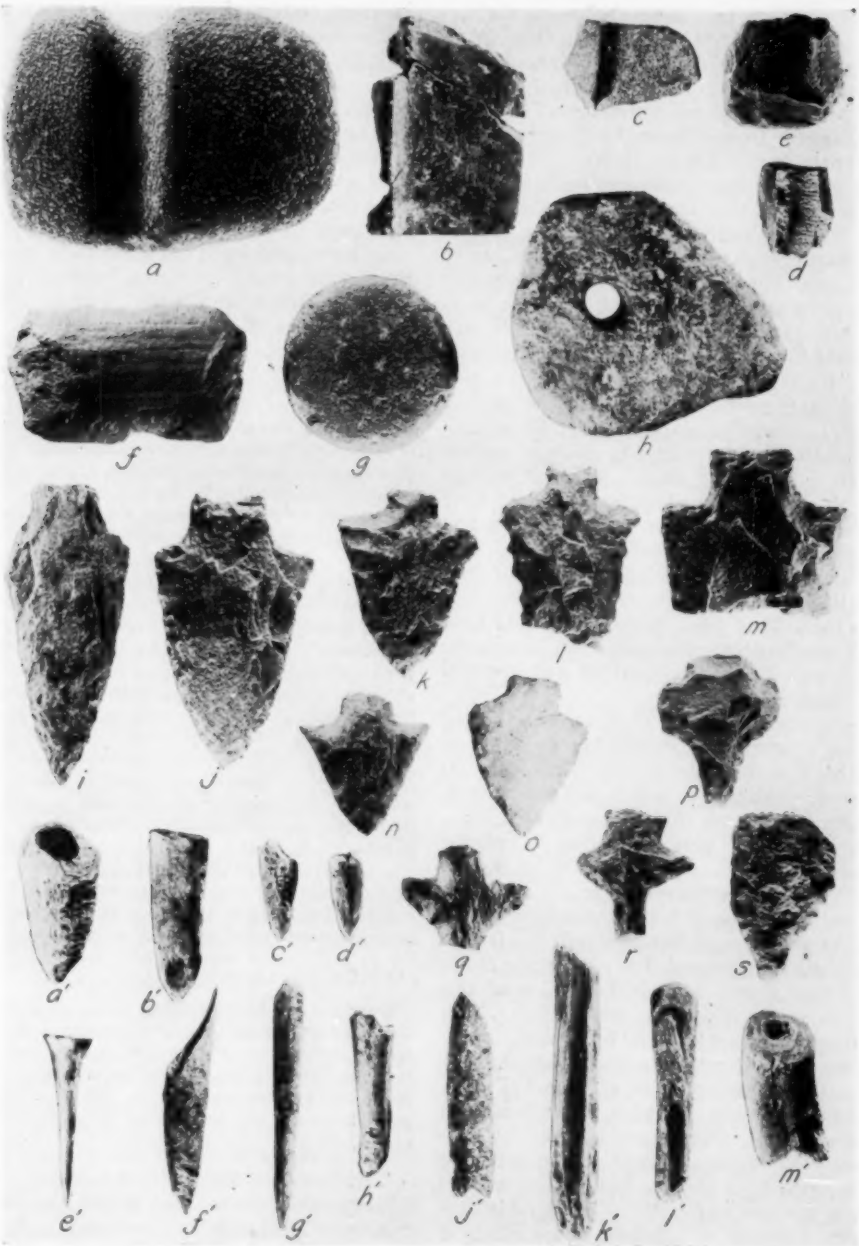

FIG. 23. Stone and bone artifacts from the Lake Springs component, Savannah River Focus.

made of aplite were found scattered through the pre-pottery level of the deposit (Fig. 23, *e*). These were possibly used as cutting tools, for a number of them have been secondarily chipped and others display well-worn edges. They range in diameter from 43 mm. to 70 mm. and in thickness from 3 mm. to 15 mm.

Two quartz stone balls were found scattered in the pre-pottery level of the midden. The smaller one is fairly round, measuring 42 mm. in diameter on its short axis and 46 mm. on its long axis. The larger stone ball measures 56 mm. in its greatest diameter and 36 mm. in its shortest diameter. The smaller one is well smoothed and is free of pits, while the larger is partially smoothed and contains some pits, which were probably present in the original stone. The use of these specimens problematical.

Hammerstones are usually made of quartz, quartzite, flint, and diorite, although nodules of aplite were used occasionally. These have been battered into near spherical form and some display partial smoothing.

Abraiders were made of hornblende and quartzite, with the cutting surfaces well smoothed. They are a distinct type and were intentionally produced for this use. All angular projections have been worn off and are well smoothed.

One grooved axe (Fig. 23, *a*) and one notched cutting or breaking tool (Fig. 23, *f*) were found on the site. The axe is only three-quarters grooved, and the butt end is badly shattered. It is made of a sandy stone and badly weathered with a definite patina forming in places. The specimen measures 125 by 100 by 39 mm. The notched instrument is made of a fine grained sandstone and is battered on either end. Very little work has gone into this instrument, all that was needed to convert the rough stone into a tool was the fashioning of two notches on opposing sides for the hafting. This specimen measures 87 by 52 by 23 mm.

Two types of net sinkers were found. The first type, not very numerous, consists of rough lumps of soapstone (steatite), either in natural form or crudely shaped, and notched just sufficiently to retain the cord of the net. The second type (Fig. 23, *h*), which is fairly numerous, is flat and perforated. Considerable care was used in the manufacture of a number of these specimens, while others were crudely shaped and perforated. A few have been perforated twice. The perforations are biconcave in cross section, indicating that they were drilled from both sides with the bore tapering as it reached toward the center of the object. The perforations appear to be indifferently placed. Some occur in the center of the specimen and others near the edge. Specimens vary in size and in thickness. The mortality rate of these objects must have been rather high, as more broken specimens were found than complete ones.

Claflin[23] has pointed out that "these types of net sinkers are by no means confined to the Stalling's Island peoples, but were in general use along the Middle Savannah River." In telling of the sinkers Jones[24] gives this detail:

> Of the sinkers, there are two varieties—perforated, and notched or grooved. Regarding them as a whole, we may state that they were usually made of soapstone, sometimes of slate, rarely of flint or hardstone, and occasionally of clay. All of the perforated sort that I have seen, with one exception, were formed either of soapstone or of clay. Consisting generally of flat or rounded pieces of soapstone irregular in shape, they vary in weight from scarcely more than an ounce to a pound and upward. The perforations are from a quarter of an inch to an inch in diameter, and are indifferently located either in the center or near the edge of the stone .... Little labor was bestowed upon the manufacture of the notched sinkers the only object being to rudely break or chip the material into convenient size, and then notch it at the opposite sides or ends so that it could be securely attached by means of a vine, a strap of deer-skin, or a thong of some kind .... These sinkers abound along the banks of the Savannah River above Augusta, and are found upon the bluffs of other streams where the Indians habitually congregated for the purpose of fishing. Near the confluence of Great (Big) Kiokee Creek and the Savannah River an extended kitchen-refuse-pile was cut in two and laid bare, some years since, by a heavy freshet. Hundreds of these perforated and notched sinkers were there unearthed, showing the great quantities manufactured and used by the natives at this point.

Claflin goes on to say:

> Unfortunately, the large village site at the mouth of Great Kiokee Creek has been completely obliterated by the ravages of the Savannah River. From an examination of the articles from this site in the collection of the late Col. Jones, now in the writer's possession, there is no evidence that this site was ever occupied by the Stalling's Island peoples.

This statement by Claflin is contrary to our findings. Prior to our visit to the site, at the confluence of Big Kiokee Creek and the Savan-

[23] Claflin, *op. cit.*, p. 32.

[24] Jones, 1873, p. 337.

nah River, someone had dug into a deep shell deposit. From their discardings and a small amount of digging on our part, we recovered a number of typical Stalling's Island Plain and Punctate sherds, besides one projectile point. There is no question but that further digging or testing will show that this site is of the same culture as that manifested by the site on Stalling's Island.

BONE ARTIFACTS

That the people who lived at the Lake Spring site were apparently good hunters of wild game, is shown by their bone-filled refuse midden. Bone and antler artifacts were fairly numerous at the site. Exceptional preservation of this material is probably due to the high lime content of the soil.

Webb[25] has noted that

> . . . the type of breakage observed is not one of simple shear, which might cause a bone to break into two parts. The broken bones generally seem to have been subjected to a torque, which not only caused the bone to break, but split as well. This produced many long pointed rough splinters, often with the end of the bone remaining attached. Some have thought that this breakage of bones was due to the desire of the inhabitants to obtain the bone marrow. Whatever the reason, the cylindrical bones show definitely that the rupture was due to a torque rather than to a simple shear. This resulted in many long splinters, which with very little work could be made into needles, awls, pins, for any purpose desired.

A number of bone splinters, which have lost all identifying characteristics, have been shaped into crude awls. These awls (Fig. 23, *f'*) show evidence of torque and have been worked down to a point; some are better shaped than others. A comparatively few have been further worked by smoothing and polishing the shaft (Fig. 23, *g'*).

The ulna of deer, being a very hard and compact bone, lends itself very readily to the manufacture of awls and was so used. The bones were split longitudinally and fashioned into well-shaped awls.

A number of cannon bones of deer show evidence of torque. These have been only superficially smoothed and pointed.

By cutting obliquely across the shaft of bird bones and grinding the severed end to a point, an awl is easily fashioned. It seems that either leg or wing bones are more suitable for this purpose. It is doubtful if the species to which the bones belonged can be identified, as all outstanding characteristic markings and articulative surfaces have been removed prior to shaping.

Fragments of split bird bones have also been altered by grinding one end to a blunt point. Again, all diagnostic characteristics are absent, making identification difficult. Such tools may have been used to indent the surfaces of the pottery vessels, forming horizontal lines of semilunar punctations.

The ulna of some small mammal has been made into an awl. Its distal end has been reduced in size and thickness by an abrasive action. The pointed end is missing from the specimen.

Portions of raccoon bacculum have been found which are highly polished, showing that they have received some use by humans.

A fragment of bone pin was recovered; this was made out of a very thin splinter of bone and brought to a decided point at an angle to the axis of the shaft. The base of the pin is missing.

A very fine example of a bodkin was recovered, measuring 64 mm. in length (Fig. 23, *e'*). This is very highly polished, and has a number of striations, around the tip of the point, at a right angle to the shaft of the specimen, which have resulted from rubbing the specimen into a sharp point. A small portion of the original articulative surface is present, but this has been altered so that identification as to species will be difficult.

The ulnae of deer were frequently used in the manufacture of spatulae (Fig. 23, *k'*). Their fine grained and rather dense composition is well adapted for just this purpose. A number of small spatulate forms are possible pottery-decorating tools; the faces of these objects fit into some of the dentate impressions found on pottery.

A forked bone spatula fragment, with a general appearance of age, was found near the middle of the midden deposit (Fig. 23, *j'*). It may be the remaining portion of some spatulate form out of which a fish-hook has fashioned and later discarded. No actual remains of fishhooks were found.

From the shaft of some large mammalian form a section of bone, 64 mm. in length, has been extracted, and worked into a semi-pointed object. The proximal end has been well

[25] Webb, 1946, pp. 281–2.

smoothed, and the medullary canal has been enlarged, not with a drill but by inserting a sharp-pointed object parallel to the long axis of the shaft. There are a number of rough grooves 1.5 mm. wide around the margin of the hole, giving a scalloped effect to the whole (Fig. 23, *b'*). The boring was extended into the interior of the canal a distance of 35 mm. and gradually tapered to a blunt point. Such projectile points were reported to have been used on atlatl darts together with points of antler and stone.

A possible fishhook fragment was found which is atypical of those associated with the Stalling's Island culture. This specimen measures 56 mm. in length. The portion recovered was at one time attached to another section, which ran parallel to the main axis of the specimen. It is half of a U-shaped object and has been definitely pointed. Triangular in cross section, it has been fashioned from a fragment of a very composite deer bone and is in a good state of preservation.

A number of deer toe bones, found scattered throughout the midden deposit, have been cut as though to extract the small amount of marrow contained therein. One bone, which is almost intact, has been partially perforated near the distal end. The hole is not large enough to extract the enclosed marrow.

Antlers of deer were apparently rather extensively used. Fragments of "green" and cast-off antlers have been recovered from the midden. No evidence of articulated deer's skulls were found. This suggests that deers were killed away from the base camp area and that only those parts which could be utilized were brought into the area. No hoof-shells were found in the two test pits, and it is believed that they should have survived in some form if they were at all present. Since antlers are shed according to season, this accounts for the cast-off remains in the midden deposit. Tines or prongs may have been broken off at the kill, brought into the village, set aside to be worked as the need arose. These tines were easily converted into various utilitarian artifacts with very little labor.

A number of bases have been recovered, demonstrating the method of separating the tines from the base. A V-shaped groove was cut around the tine near the base and, when nearly worked through, it was broken from the base, leaving a rough end. The base was discarded as worthless. Sometimes a tine had a mid-section removed in the same way with the exception that the V-cut was made through the hard outside wall and, when the pulpy section was reached, this was severed by simply hitting it with a sharp blow, so that it broke away from the main section of the antler.

Some of the prongs have been fashioned into projectile points (Fig. 23, *a'*). A fine example was found in the pre-pottery level which shows that a stone tool was used to whittle the outside of the prong into shape, bringing it to a dull point. None of the bone and antler points found has been brought to a very fine point, and it would seem that a dull point was preferred. The base of the antler point in question has not been squared off but tapers in a definite bevel (half of the V-cut). Since the outside surface has not been smoothed and the base squared and polished, it can be said that the specimen was in the formative stages of completion. The pithy core has been gouged out leaving a conical-shaped hole for the insertion of the shaft. This specimen measures 93 mm. long, with an external diameter at the base of 33 mm., and a bore 17 mm. in diameter.

A number of antler tips have been sharpened and slenderized by scraping. Objects of this type may have been used as awls or flaking tools.

Chisels were made by working a deer tine into a flat spatulate form and by cutting and grinding a beveled blunt point. The base of the tine was hollowed out, producing a conical hole in which a wooden handle was probably inserted.

Small triangular tips were made from split antlers times, cut and scraped into fairly sharp points. These resemble gravers of stone, with the exception that the point is not as finely fashioned nor as sharp (Fig. 23, *c'*, *d'*). Their use is problematical.

A number of antlers drift were also located. Because antler is strong, tough, and easily worked, it is easily adapted for many uses, e.g., in the manufacture of chipped stone artifacts. These drifts have blunt points and were either cut or rubbed into this shape.

BURIAL

After Pit B had been dug through the midden deposit, it was noticed that a disturbance extended into the undisturbed sand bar upon which the site was built. The walls of the test pit were carefully smoothed off in order to ex-

pose the origin of this sub-midden disturbance. It was found that its walls extended up to the bottom of the shell deposits but did not break through. From this it was concluded that whatever lay within the disturbed area was placed there very early in the occupation of the site.

In removing the disturbed dirt, one of the workmen brought up part of a skull on his shovel, indicating that it was a burial pit. After the skeleton was exposed it was noticed that it lay on its left side, flexed, and was placed in a "round" grave. The head lay higher than the pelvis.

Dr. Marshall T. Newman, of the U. S. National Museum examined the skeleton and gave us the following information:

Sex and age. Skull and skeleton belong to a medium muscled male 50–60 years of age. Probably more than half of the teeth were lost before death; on the mandible, second premolars and all three molars on each side were thus missing. The lumbars show extensive arthritic lipping, and the left knee joint exhibits extreme arthritic changes—especially irregular lipping and "polishing" of the articular surfaces.

Deformation. There are traces of occipital flattening, making for slight cranial asymmetry in favor of the right side. This sort and degree of deformation is wholly unintentional, and probably indicates a fairly hard cradle.

Racial type. The length-breadth index is 80.90, barely round-headed. This morphology is definitely more Centralid (Gulf) than Silvid (Algonkin), and I believe the skull represents the early type of Centralid seen in Florida, northern Alabama, and other parts of the Southeast. Stature calculation gives 167 cm. (5′ 5¾″).

Skull measurements:

Glabella-occipital length, 178 mm.
Maximum breadth, 144 mm.
Auricular height, 124 mm.
Minimum frontal diameter, 103 mm.
Length-breadth index, 80.90
Length-auricular height index, 69.66
Nasal root breadth (dac-dac), 20.3 mm.
Right orbital breadth (dac), 42.0 mm.
Right orbital height, 32.2 mm.
Minimum breadth ascending ramus, 33.0 mm.
Mandibular symphysis height, 33.0 mm.
Right orbital index, 76.19

Observations. The most striking features are:

A broad frontal of slight slope
A very high cranial vault
A low, medium-pinched occiput
Medium temporal fullness
Medium nasion depression, and a sharply angulated nasal structure
Deeply concave nasal profile
Broad nasal aperture
Rhomboid orbids

Long bone measurements:

Right femur: maximum length, 455 mm.; bicondular length 449 mm.
Left femur: maximum length, 450 mm.; bicondular length 445 mm.
Right tibia: maximum length, 378 mm.
Right radius: maximum length, 249 mm.
Right ulna: maximum length, 272 mm.
Left ulna: maximum length, 265 mm.

CULTURE TRAITS

Following Fairbank's order of listing, the following traits have been noted as found at the Lake Spring site:

SUBSISTENCE ACTIVITY:

Collecting complex:
Collecting of mussels and snails
Possible beginnings of agriculture complex:
Use of mortars and manos
Hunting and fishing complex:
Deer, raccoon, rabbit, turkey, elk, waterfowls, fish, gar, sturgeon, etc.
Use of atlatl
Use of nets, inferential; from supposed use of the steatite objects as net sinkers

COMMUNITY PLAN ACTIVITY:

Village location and plan complex:
Villages near streams
Shell mounds, or deep middens
Fire-cracked stones in debris
Midden pits frequent
Fired areas
Hearths of fired clay
Architectural complex:
No evidence of post-molds, floor levels, or structures

BURIAL ACTIVITY:

"Round grave" burial
Flexed burial
Burial below shell mound or midden
Burial with no utility artifacts
Burial with no ornaments

TECHNOLOGICAL AND ARTISTIC ACTIVITY:

Pottery complex:
No certain coil fractures
Pottery in upper levels only
Pottery fiber-tempered
Bowl forms only
Rims and lips are usually simple
Rims usually straight and only occasionally are they incurving
Semilunar punctates
Circular punctates
V-shaped punctates
Vertical punctates
Horizontal lines of linear-punctates
Vertical lines of linear-punctates

Simple meander lines of linear-punctates
Incising, narrow line
Incising, broad line
Random punctates
Crosshatch of broad and narrow lines
Crosshatch of fine lines
Rough stone complex:
Hammerstones, spherical
Mortars
Manos, disk-shaped
Axes, notched
Chipped stone complex (probably only percussion chipping):
Drills, straight
Drills, expanded base
Drills, cruciform
Gravers
Blades, large ovate
Projectile points, large symmetric
Contracting stem
Straight stem
Square base
Slightly concave base
Usually square shoulders
Use of flints and metamorphosed slates
Cache of flakes
"Patella-shaped" objects
Re-utilized chips
Hoes, slate, ovate
Ground stone complex (pecking, grinding, drilling, and polishing techniques):
Atlatl weights (bannerstones) rectanguloid
Axes, grooved
Discoidals
"Net sinkers," perforated steatite slab
"Net sinkers," notched steatite pebbles
Bone complex (cutting, sawing, drilling, and polishing techniques):
Cut antler sections
Antler drifts
Antler, projectile points, socketed
Antler, flakers
Antler, handles
Awls, bone splinter
Awls, cannon bone
Awls, ulna
Awls, bird wing and leg bones
Blunt bone tools (pottery decorators)
Bodkins, expanded base, short
Pins, short, cylindrical
Spatulate forms
Chisels
Fiber complex:
Use of cordage in pottery decorative design
Design complex:
Alternate decorated and plain areas
Crosshatching
Horizontal parallel lines
Simple meander

CONCLUSIONS

The testing of the site and the study of the materials found seem to indicate that the site was occupied by at least two different cultural groups. The first and longest occupancy may be attributed to a pre-pottery, hunting, and food-gathering group. This same group, or a similar group almost identical to it, carried their occupation into the beginning of the art of pottery-making and the building of a shell mound. Their culture is characterized by the list of cultural traits which has been given above. The second and last occupancy appears, from all indication, to have been by much later Woodland and Mississippian peoples, and of a very limited time, as is demonstrated by the few sherds recovered.

An examination of the recovered artifacts reveals that the people who originally occupied Lake Spring site were comparable to those occupying sites on Stalling's Island, Big Kiokee Creek, Chester Field, and Bilbo, all components of the Savannah River Focus, Stalling's Island Aspect, Woodland Pattern. That these people had a distinctive pottery and stone industry is readily shown by their artifacts.

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CLARENCE T. HURST, 1895—1949

OMER C. STEWART

THE death of Dr. Clarence Thomas Hurst leaves a noticeable vacancy in the ranks of American archaeologists, because he was an outstanding member of that rare company of "expert amateurs." Since there are few professional archaeologists in America in proportion to our large area, we cannot have rapid progress until we develop more of the people, so important to the development of European prehistory, who make sound and significant contributions to our knowledge of American prehistory as a hobby or avocation.

Dr. Hurst was one of these but first he was a zoologist, having received his Ph.D. in that field at the University of California in 1926. After teaching zoology at Mills College for two years, he went to Western State College of Colorado at Gunnison where he remained until his death. After 1930 he was Dean of the Graduate School at Western State and after 1937 head of the Division of Natural Science and Mathematics. In 1933 he had an appointment as a Research Associate in Zoology at the University of California.

It was about this time, while working on zoological research and teaching zoology as well as performing many extra administrative chores for his college, that Dr. Hurst started to become an archaeologist. His decision came about as the result of a loan to Western State College of a large private collection of prehistoric pottery and artifacts, mostly collected in the Southwest. Dr. Hurst took the responsibility of seeing that the collection was adequately preserved and exhibited, which led to a thorough study of Southwestern prehistory. By 1935 he had become aware of the need to protect antiquities from irresponsible curio

FIG. 24. Clarence T. Hurst.

hunters. For this purpose and to further adult education in Colorado prehistory, he helped establish the Colorado Archaeological Society. Started as a local western Colorado society, it published the first issue of *Southwestern Lore*, the journal of the Society, in June, 1935, just two months after the Society was founded. As executive secretary and editor for the Society from its beginning until his death, Dr. Hurst was personally responsible for its stability and growth. He wrote enough to insure the continuation of the journal and alone handled the business of the Society.

Always understanding and patient with "arrow-point collectors" and "pot-hunters," Dr. Hurst nevertheless left no doubt about his stand for protection of antiquities and for scientific excavation. Numerous editorials in *Southwestern Lore* and several speeches at State conventions reiterate this point. It is remarkable that so many remained to be taught and came back for more, and even paid for the lessons. From nothing in 1935, the Society grew until today there are 425 paid memberships in Colorado and about 150 from other states. The regular appearance of four issues a year of *Southwestern Lore* for the last 14 years has been an important factor in the steady increase in membership.

Southwestern Lore can best be characterized as semi-professional, for it has contained many popular articles along with those by Frank H. H. Roberts, Marvin Opler, E. B. Renaud, Frederic H. Douglas, Erik K. Reed, and other professionals. It has also been the means by which Dr. Hurst has made known his own work. In 1939 reports began to appear concerning Dr. Hurst's personal archaeological research, and in the summer of that year he excavated in Tabeguache Cave. "Tabeguache" is now known as an interesting and peculiar culture which must be taken into account in the history of the Southwest and its northern periphery. The material suggests that "Tabeguache" people existed in western Colorado in pre-Basket Maker times, as well as during the time of the Basket Makers.

The leading article in AMERICAN ANTIQUITY for January, 1949, entitled "A Corn Cache From Western Colorado," written by Dr. Hurst and Dr. Edgar Anderson, gives a fair summary of Dr. Hurst's work and indicates what can be accomplished by an amateur archaeologist who is willing and able to become an authority in a limited area. Dr. Hurst should be commended also as a good example to all for the way he quickly published results of his field work. Starting with his first excavation in the summer of 1939, for which a 14-page report appeared in June, 1940, Dr. Hurst has published the results of each field session within six months and a comprehensive analysis of the site within a year of the completion of each cave.[1] For example, the excavation which yielded the material for the AMERICAN ANTIQUITY article referred to above, was made in the summer of 1947. Because of Dr. Anderson's ready cooperation and speed in analyzing the corn, the manuscript was submitted in July, 1948.

At the age of 53 Dr. Hurst, a thoroughly competent archaeologist, embarked upon a program of study which would undoubtedly have broadened his perspective and further sharpened his analytic ability. Taking his first leave from teaching and administrative duties in 15 years, he left Gunnison in August, 1948 to study for six months in museums of eastern states. He spent most of his time at the Peabody Museum at Harvard University, where accommodations and assistance were made available to him. However, illness in Cambridge deprived him of the scholarly pleasure he had hoped for, and when somewhat recovered, he tried to return home. Upon reaching Omaha, where his wife was staying with relatives, the seriousness of his condition became apparent and he entered the hospital on November 23 where his death occurred on January 17, 1949 from a bacterial heart infection which seemed to have been an aftermath of the pneumonia suffered in Cambridge.

It is with great personal as well as professional regret that I record the passing of Dr. Hurst. He was a sincere and understanding friend to many, and one of the best of the expert amateurs in his adopted field of archaeology.

University of Colorado
Boulder, Colorado
March, 1949

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[1] For a bibliography of Dr. Hurst's publications, see *Southwestern Lore*, Vol. 14, No. 4, pp. 83–8. *Editor.*

FACTS AND COMMENTS

A NOTE ON SOME LARGE PITS IN CERTAIN SITES NEAR DALLAS, TEXAS

During August and September, 1948, the writer made an archaeological survey of the Lavon Reservoir area in Collin County, Texas. This was a project of the River Basin Surveys program of archaeological salvage, undertaken by the Smithsonian Institution, with the cooperation of the Corps of Engineers and the National Park Service.[1] This reservoir is being built on the East Fork of the Trinity River near Wylie, Texas and approximately 25 miles northeast of Dallas.

Twenty-five sites were located in or near the proposed reservoir area during the course of this survey. Nineteen of these appear to be small, temporary campsites, some producing a few potsherds; others are apparently non-pottery sites. However, six of the sites appear to be permanent village locations occupied by relatively large groups of pottery-using people over a long period of time. The material from these sites is in the process of laboratory analysis at the present time and a statement of the cultural affiliations involved cannot yet be made. The sites do belong among the Caddo villages of middle or late prehistoric times.[2] Besides the sites in and near the Lavon Reservoir, the writer visited eight other sites on the East Fork of the Trinity River in Collin, Rockwall, and Kaufman counties. Of these, five appear to be permanent villages similar to the above mentioned six.

All of these sites have been known for many years, and the members of the Dallas Archaeological Society have collected artifacts from them and carried on minor excavations in them during that time. These people have used excellent control in their collecting and excavating and have carefully recorded their findings. Their notes and collections, as well as their active field participation, proved to be a great help in the present survey.[3]

It was noticed some years ago, by the members of this group, that each of the large village sites along the East Fork of the Trinity possessed one feature in common. Each contained a single, large, circular pit near its center. These pits now are somewhat difficult to see as cultivation and river overflows have tended to level them off considerably. Nevertheless, they are still discernible. The writer visited eight of these sites and was told of three others. None of the small campsites appear to have contained these large pits. The pits are all very much alike in size, shape, and location within the site, and as the feature was quite unusual it was decided that one should be test-trenched for further information. Members of the Dallas Archaeological Society assisted the writer in this trenching, and the pit at Hogge Bridge site (41-18C9-1) in Collin County, within the Lavon Reservoir, was selected as being most typical.

This site is located on the north side of the East Fork of the Trinity River (see sketch map, Fig. 25) and covers approximately 3 to 4 acres from the river north to the edge of the uplands (shown as fields in the sketch map), and from an overflow slough on the west a distance of roughly 400 feet to the east. It is entirely within the present floodplain of the East Fork and is subject to annual overflow from that stream. The pit is located near the center of the site and is a very symmetrical circle in shape with a concave, excavated interior, the soil from which was used to build up the rim. The entire area in which the pit is located, including the pit itself, has been cultivated, sporadically, for some 50 years and this cultivation, coupled with annual flooding, has removed a considerable quantity of the surface soil.

At present the pit is 90 feet in diameter, measured from the crests of the rim, and the surface of the center of the pit is now 1 foot below the general level of the surrounding ground. The crest of the east rim is 4.5 feet above the interior surface and the north, west, and south rims have eroded gradually down to 2–3 feet above the interior surface. The impact of flood waters first hits the west rim of the pit causing more erosion here than on the east rim. An east-west test trench was excavated through the center of the pit and showed that 26 inches of fill had been washed into the pit in the process of erosion of the rim. Assuming an erosional loss of 2 feet of elevation at the crest of the east rim, a total depth of 8.5 feet can be postulated for the pit while it was in use (see profile). The test trench further showed that the original interior surface was concave with gradually sloping sides, and on this surface were found numerous concentrations of mussel shells, broken bones, and flint and chert chips. There were also three nondescript scrapers, a clay-tempered, brushed potsherd, and several small fragments of burned clay. Similar material plus shell-tempered potsherds and fragments of broken glass bottles were found scattered sporadically through the depositional fill, as well as on the surface of other sections of the site. No post holes, fire hearths, or other evidences of a superstructure were found.

The landowner stated that the pit was 10 or 12 feet deep when the land was first put into cultivation, and that no overflow water ever entered it at that time, the rim being of a uniform elevation. Nearly all of the interior fill, as well as the rim erosion, has occurred in the past 50 years. Landowners at other sites where these pits occur made similar statements regarding the size and descriptions of the pits in pre-cultivation times.

The purpose of these pits is still unknown. Perhaps they were used as outdoor dance or game arenas or for other ceremonial purposes. Perhaps they were public council arenas. Certainly they were large enough for all of the inhabitants of the village to sit around the rim and watch some event taking place within the pit. However, it is still

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[1] The permission of the Smithsonian Institution for publication of this article has been kindly granted the writer by Dr. Frank H. H. Roberts, Jr., Director of the River Basin Surveys.

[2] Krieger, 1946, pp. 171–216.

[3] The writer is indebted to Mr. and Mrs. R. K. Harris, Mr. and Mrs. Lester Wilson, Mr. Rex Housewright, Mr. J. B. Sollberger, Mr. Henry Hanna, Mr. Robert Hatzenbuehler, and Mr. C. R. Allen for assistance in the field and an opportunity to study their notes and materials, as well as for their excellent hospitality.

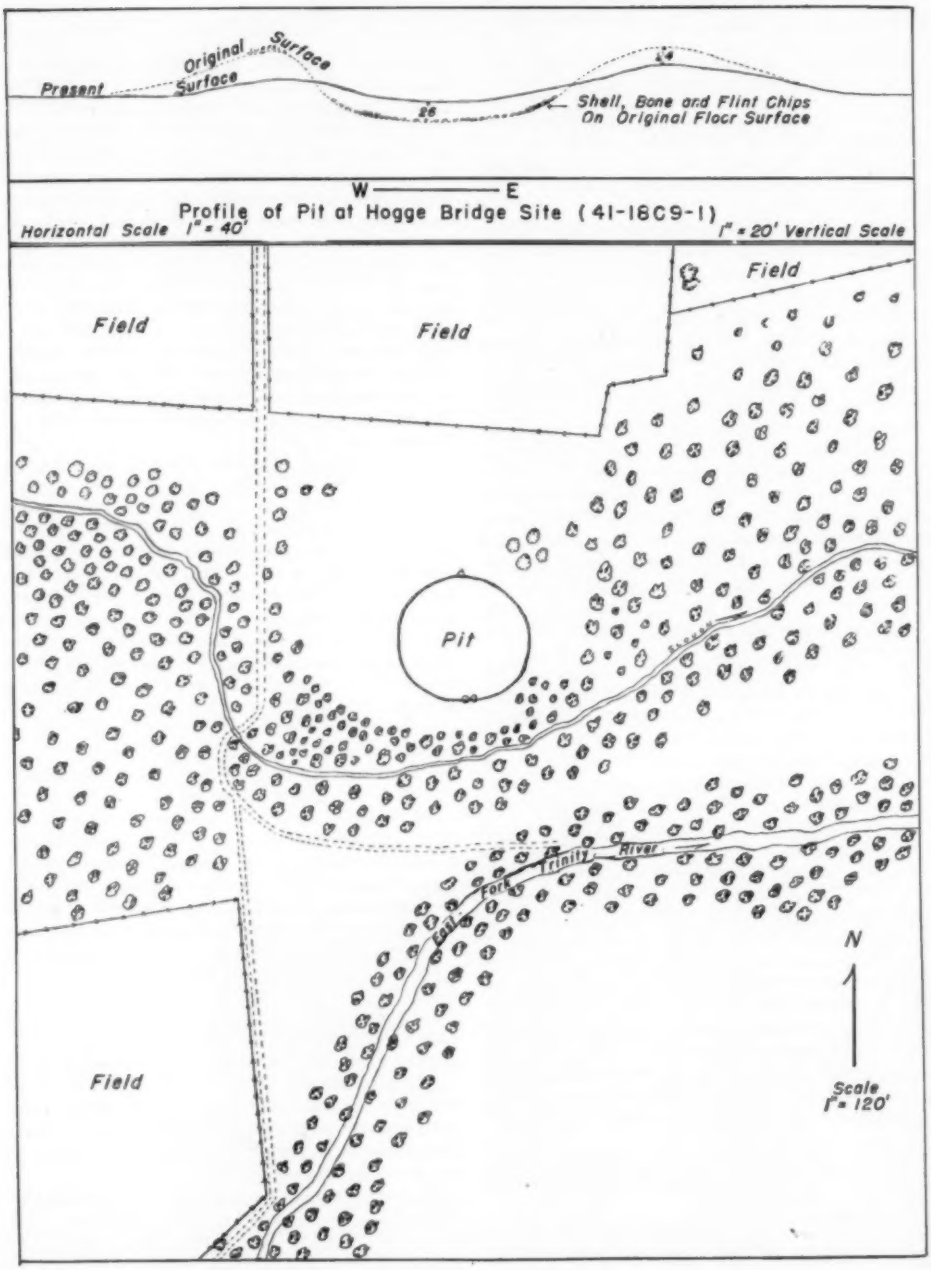

FIG. 25. Profile and plan of the Hogge Bridge site (41-18C9-1).

possible that the test trench (4 feet wide) was not wide enough and missed the post holes and fire hearths of a large, semi-subterranean building. At any rate it would seem that the construction of a pit of this size would require the cooperative effort of all or most of the inhabitants of the village and would have some religious or administrative function in which all could share. Wedel found circular pits in Kansas that were, in some respects, similar to these but with raised centers and superstructures arranged around the inside edge.[4] Swanton describes community centers in the Caddo villages that are somewhat similar, but these each contain a large building.[5] So far as the writer is aware, no other occurrence of this type of pit is known. Any evidence to the contrary would be very much appreciated.

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ROBERT L. STEPHENSON
River Basin Surveys
University of Texas
Austin, Texas
January, 1949

[4] Wedel, 1942, p. 4.
[5] Swanton, 1942, pp. 148–54.

SOUTHWESTERN PITHOUSES

In the January, 1949 number of AMERICAN ANTIQUITY T. L. Smiley presents a concise description of an early eighth century pithouse at Mesa Verde.[1] He notes the occurrence of a similar pithouse excavated by Brew at Alkali Ridge in southeastern Utah,[2] and a second similar structure described by Morris from the La Plata area.[3] The purpose of this note is to broaden the comparative picture by indicating a third pithouse even more closely resembling the Mesa Verde one. This is Pithouse G, Site 2, excavated by Martin in 1938 in the Ackmen-Lowry area in southwestern Colorado, not far from Mesa Verde.[4] The Ackmen-Lowry pithouse is nearly identical with the one described by Smiley. Tree-ring dates from the former structure range from A.D. 736 to 768, which make it some 60 years later than the Mesa Verde pithouse, though in the same Basket Maker III period.

A point of interest relating to the Mesa Verde pithouse is that it does not seem to have been associated either with a series of slab-sided surface rooms or to have been part of a larger site, as was the case with the pithouses dug by Brew, Morris, and Martin. The Mesa Verde pithouse was discovered accidentally, as there were no surface indications, and though it is impossible to be sure about the point, the pithouse may represent an isolated structure. In such a case, it presents a contrast with the large Basket Maker III sites common in this area. Martin has pointed out that in the Ackmen-Lowry region, these large Basket Maker III sites were followed by very small ones, which gradually increased in size up to the masonry villages of Pueblo III times.[5] This trend reflected a concentration, dispersion, and slow reconcentration of population. Smiley's pithouse may represent a slightly earlier stage preceding the concentration of population in large Basket Maker III sites. The results of Gila Pueblo's recent work at Mesa Verde should help settle the problem.

The apparent cyclical nature in the size of sites in this corner of the Southwest is worth further investigation. The variation in the size of sites through time can be correlated not only with recurring concentration and dispersion of population, but also with changing patterns of social organization, particularly the nature of the local group. As archaeological and ethnological knowledge of the Southwest expands, we should be able eventually to make much more fruitful inference from archaeological data as to the changing forms of social organization that accompanied the development of Southwestern culture.

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ALEXANDER SPOEHR
Chicago Natural History Museum
Chicago, Illinois
March, 1949

[1] Smiley, 1949.
[2] Brew, 1946, p. 177.
[3] Morris, 1939, p. 64.
[4] Martin, 1939, pp. 380–3.
[5] Martin, 1939, pp. 458–73.

SUGGESTED USE OF CLAM SHELLS

Clam shells, particularly species of *Elliptio*, considerably worn from use, were found by the late W. J. Wintemberg in a number of comparatively recent archaeological sites in Ontario, such as Roebuck, Lawson, Uren, and Sidey-Mackay.[1] He suggested that some of these had been used as knives, as scrapers, and as tools for shaping pottery vessels.

Among the specimens collected were several which showed attrition in the middle of the longer side, as shown in Figure 26. Wintemberg was apparently unable to suggest to what use these might have been put.

The following extract from *Memoirs of Odd Adventures, Strange Deliverances, etc. in the Captivity of John Giles,*

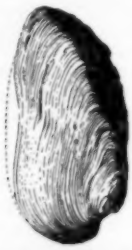

FIG. 26. Clam shell scraper, Ontario.

Esq. . . .[2] may afford an explanation: "To dry corn when in the milk, they gather it in large kettles and boil it on the ears, till it is pretty hard, then shell it from the cob with clam-shells, and dry it on bark in the sun."

John Giles was "seized by the Indians" in August, 1689 (?) "about three miles above Fort Charles, now in the township of Jamestown," in the State of Maine. It would appear probable that a clam shell used as he described would be abraded in the way shown.

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DOUGLAS LEECHMAN
National Museum
Ottawa, Canada
January, 1949

[1] Wintemberg, 1908, pp. 43–4; 1928, pp. 8, 43; 1936, pp. 22, 54; 1939, p. 14; 1946, pp. 158, 167; 1948, p. 19.

[2] Giles, 1869, p. 21.

AN AUTHENTIC GLASS ARTIFACT

In view of the vast number of spurious glass artifacts known, it is of interest to note a genuine example which came to light recently in excavations in Florida.

The scraper illustrated with this note (Fig. 27) is made of heavy green glass, and is a perfectly good aboriginal piece

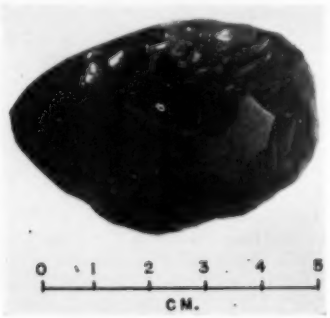

FIG. 27. Glass artifact from Florida.

in form and workmanship. The length is 57 mm., the width 36 mm. The greatest thickness, 11 mm., lies near the steep nose at a point where original surfaces are present on both bottom and top. Undoubtedly, the material was derived from a heavy green glass bottle.

The artifact was found in test excavations at the site of San Luis de Talimali, several miles west of the city of Tallahassee, Florida. San Luis was the major Spanish settlement in the Apalachee area during the seventeenth century, and at the time of its abandonment and destruction in 1704 consisted of a fort and blockhouse, a mission, and a number of dwellings inhabited by both Spaniards and Indians. The population in 1675 was given as 1400 persons, more or less.[1] Test excavations revealed materials very similar to those from the mission of San Francisco de Oconee, type site for the Leon-Jefferson period, located about 25 miles southeast of San Luis.[2]

[1] Mark F. Boyd, "Enumeration of Florida Spanish Missions in 1675," *The Florida Historical Quarterly*, Vol. 27, No. 2, pp. 181–8, St. Augustine, 1948.

[2] A summary of the Leon-Jefferson materials is given in Hale G. Smith, "Two Historical Archaeological Periods in Florida," AMERICAN ANTIQUITY, Vol. 13, No. 4, pp. 313–19, 1948.

There is no doubt but that the scraper belongs with the site, and it must be given a late seventeenth or very early eighteenth century dating. It was found 1.3 feet beneath the surface in an area very near to, if not within, the western wall of the fort.

This is not the first example of a glass artifact from a historic horizon in Florida. C. B. Moore discovered a glass cross, probably European in manufacture, and a glass pendant showing aboriginal workmanship in a mound on Pine Island in southern Florida.[2] Small glass scrapers were also found at the contemporaneous Macon Trading Post in Georgia.[3] Such finds are of interest to the archaeologist as examples of the extension of aboriginal techniques to European materials during the critical and interesting period of contact and acculturation.

JOHN W. GRIFFIN
Florida Park Service
Gainesville, Florida
February, 1949

[2] C. B. Moore, "Miscellaneous Investigations in Florida," *Journal of the Academy of Natural Sciences of Philadelphia*, Vol. 13, pp. 307–8, Philadelphia, 1905.

[3] Information from Charles H. Fairbanks.

A UNIQUE WOODEN FIGURE FROM ANCIENT MEXICO

Among the Mexican antiquities in the Ethnographical Museum in Vienna dating from the time of the Conquest is a small wooden figure bearing the accession number 12,585. Though this object has received cursory attention in previous publications,[1] it has never been fully described. Because of its unique design and the unusual complexity of its structure, the piece merits a full technical description.

In 1881 this figure was transferred from the then "Imperial Cabinet of Coins and Antiquities" to the then Anthropological-Ethnographical Division of the Imperial Museum of Natural History, which later became the present Ethnographical Museum (Museum für Völkerkunde). According to information supplied by Professor F. Eichler, Director of the Division of Antiquities in the Museum of Art, the object cannot be traced back farther than its entry under the number XIII/47 in the fifth volume of the "New Inventory" of the Cabinet of Coins and Antiquities. It is not known from what earlier collection it entered the "Cabinet." Possibly it came from the Imperial Treasure (Schatzkammer). In the description of these collections by von Sacken and Kenner, compiled in 1866,[2] this figure is listed under the doubtful heading "Indian images, largely [grösstenteils] brought back by Carl Baron von Hügel, and other Asiatic objects." But it could hardly have belonged to Hügel's collection.

This figure is not mentioned in the inventory of the Imperial Treasure made at the command of the Empress Maria Theresia in about 1750;[3] but it might have been one of the objects listed summarily, or regarded as unworthy of entry. The following observation in the inventory seems to support this conjecture: "Nun folget, was sich in denen zweien grösseren kästen ober denen medaillienladen, wovon die thüren von spiegelgläsßer, befindet, und zwar ohne numero als erstlich . . . . Nebstdeme seind in beeden angemerkten kästen 54 stuck verschiedene figurl, busten, idolen, Lares oder hausgötzen, opferlampen von verschiedenen nationen, so theils von stein, theils bronzo auch von gebrennter erde, wovon ville antique aber mehrenteils unbekannt." There is, to be sure, no specific mention here of wooden objects.

Heger[4] suggests that a remark in the inventory made after the death of Archduke Karl of Steiermark in 1590[5] might possibly be taken to refer to this figure, inasmuch as three shields, possibly of Mexican origin, are there mentioned in connection with an object which seems to answer vaguely the description of our piece. Thus: "Andere alte rüstungen. Ain mohrenangesicht mit etlichen türgesen und zwaien grossen perlin, darauf drei edlgestain und ain grosz perl verlorn. Drei Yndiänisch rundelln . . . ."

All we may be sure about is that this figure must have been kept in various "cabinets" ever since the time when, shortly after the Conquest, such objects were brought to Europe. The relatively excellent condition of its perishable material suggests as much. Though the figure may have been in the possession of the Hapsburgs from the time of its arrival in Europe, it is not impossible that it reached the "Schatzkammer" or the "Cabinet of Coins and Antiquities" at a later date and through other channels.

The figure is carved out of a dark brown deciduous wood and covered with dark lacquer. That this coating followed the insertion of inlays is attested by the fact that the cord of the left ear-pendant of the little head on the stomach is partly covered with lacquer. In some places the lacquer is flaked or scraped off. The carving of the genitals was evidently given some finishing touches after the lacquering, as the coated surface is there marred by cuts which were not later smoothed away.

The representation is that of a naked male figure crouching with the hands grasping the legs (Fig. 28). The head, finished with greater care than the rest of the figure, accounts for more than half the total height. At the two sides are flat triangular surfaces decorated with carving and with inlays, now lost. The back is hollowed out and filled with resin.

The measurements are as follows: height to the golden nail-head on the right, 90 mm.; to that on the left, 91 mm.; to the chin, 38 mm.; width of the base, 71 mm.; thickness, including the little head, 63 mm.; breadth of the back, 68 mm.; height of the triangular plane at the right, 66 mm.; of that at the left, 65 mm.; distance between the peaks of the triangles, 56 mm.; weight, 168.5 grams.

The head has a bestial aspect, with a snout, but human ears. If the two knobs on the crown are taken for the torn-off dog's ears of Xolotl, it might easily be concluded that the face is peering from a skin-mask. In that case, the hair,

[1] Heger, 1888, p. 94; Lehmann, 1922, Pl. 7; Saville, 1922, Pl. XXVII and p. 82.

[2] Sacken, 1866.

[3] Zimmermann, 1869.

[4] Heger, 1906.

[5] Zimmermann, 1888.

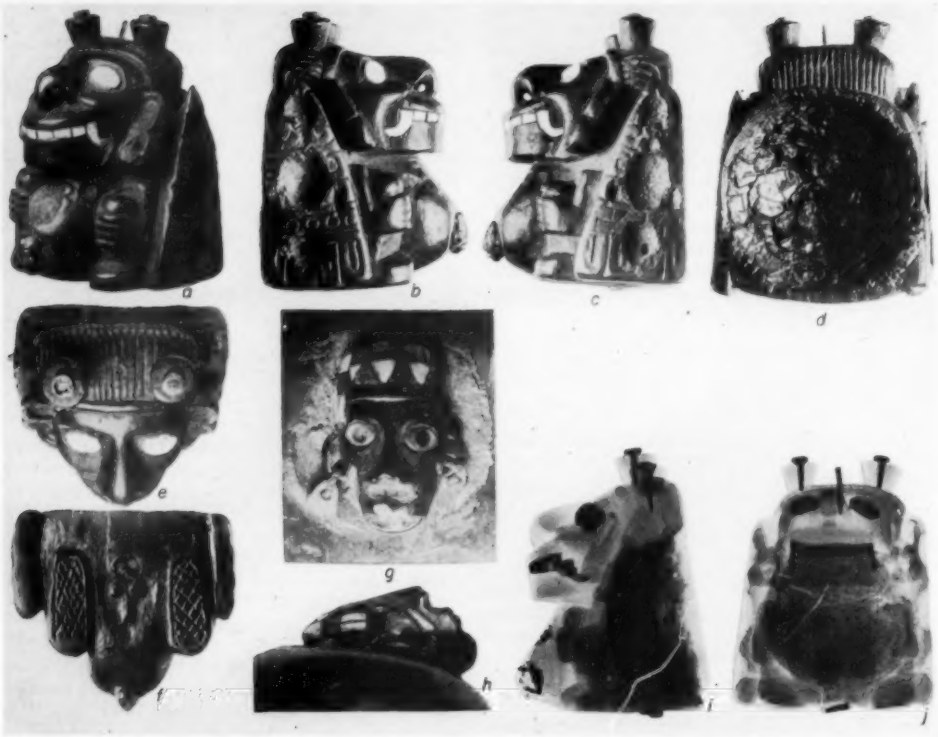

FIG. 28. Wooden figure in the Vienna Ethnographic Museum: *a*, front; *b*, right side; *c*, left side; *d*, back; *e*, top; *f*, bottom; *g*, enlarged front view of the little jet head; *h*, enlarged side view of the little jet head; *i*, X-ray, taken with the film under the right side; *j*, X-ray, taken with the film under the back. (*i* and *j*, courtesy of Dr. J. Zakovsky.)

represented by 29 furrows, together with the roll separating it from the forehead, could be regarded as the mask—though the conception is not very clearly carried out. Representations of Xolotl in the codices also show four ears—two human and two torn-off animal ears.

The eyes consist of two pieces of the white shell of a sea-mussel, 11.5 mm. wide, which are fastened, like all the inlays, in a bed of resin. If pupils were originally attached to the smoothed frontal surfaces of the shell, they have fallen off. The two 9-mm. fangs and the six 3-mm. incisors are made of the same white shell. The septum is perforated so as to end in a loop, which probably served for the suspension of an ornament, now lost. Ear-ornaments imbedded in resin have also fallen out, while perforations in the ear-lobes presumably once held pendants, or possibly inlays fastened on pegs—more likely the latter, as there are traces of resin in the holes.

The two knobs on the head, each 10 mm. high, are finished with nails, of which the golden heads are 1.5 mm. high and 6 mm. in diameter (Fig. 28). The upper surfaces of these nail-heads clearly show that they were cast by the lost-wax method. Each golden head was driven into the wood by means of a four-cornered silver pin, 2×2 mm. in section, which, to judge from the top of the pin visible through a break in the golden head on the left, was inserted in the head at the time of casting. The gold content of the broken head is greater on the surface than inside. The two wooden knobs with their golden nail-heads may represent the torn-off ears of Xolotl; or they may represent other ornaments. On the head of Xolotl as represented in the Codex Borgia a pair of precious stones is actually shown next to the dog's ears.

From the middle of the crown a silver pin of 1 sq. mm. section projects to a height of 6.5 mm. It probably once carried an ornament of some sort, perhaps a golden nail-head like those just described. The sharp edges of the square pin suggest that it was forged rather than cast. The fact that it is bent back slightly suggests that the ornament which it originally carried may have been forcibly removed. The furrows representing the hair of the figure also show dents which may be derived from this act of vandalism. The length of the three silver pins is shown in the X-rays.[6] The

fact that the central pin is half again as long as the pins with golden nail-heads suggests that the ornament or head it carried must have been of considerable size.

Carved in flat relief on the chest is what appears to be a butterfly, 20 mm. wide, with two antennae and four wings, its center once occupied by an inlay, the loss of which leaves a hollow filled with the same calcareous resin as that holding the little head on the navel. The dark spots in the X-rays show the relative sizes of these inlaid masses of resin. Around the lost inlay in the center of the butterfly, as well as around the little head on the navel, to be described presently, the wood is carved flat. At the sides of the butterfly are two little asymmetrical hollows, without traces of resin, whose purpose is not clear.

The arms and legs of the figure are treated schematically, the four fingers of the hands grasping the shanks below the kneecaps.

The triangular side-pieces are perhaps to be regarded as knots or loops attached in some way to the head (Fig. 29). If so, they might belong to the band confining the hair behind the forehead. The low-relief decoration of these triangles is divided into two parts, of which the upper consists of

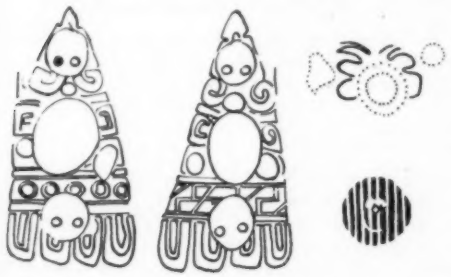

FIG. 29. Relief decoration of the two side triangles, carved "butterfly" on the chest, and pattern of depressions on the furrowed hair of the crown suggesting the original presence of an ornament attached to the silver nail in the center.

volutes, while the lower is different in the two triangles, that on the right showing a band with circles, that on the left a plaited band. Each triangle ends at the bottom in a row of four leaves, which might stand for a textile pattern. A similar ornament occurs frequently on the feet of vessels as early as the Teotihuacan culture.

Interrupting the design of each of these triangles, and irrelevant to it, was a group of three large inlays, now lost, leaving only the holes in which they were imbedded by means of resin and, in the case of the upper and lower inlays, by means also of a pair of wooden pegs. In the triangle on the right the peg at the rear of the upper inlay is still in place. This peg, cut in a roughly hexagonal shape and measuring 14×2.5×2 mm., projects 1.5 mm. from the surrounding surface. The bores for insertion of the missing pegs are from 9 to 13 mm. deep and 2 to 3 mm. in diameter at the orifices, each bore converging to an inner point.

Projecting from vertical bores between the head of the figure and the points of the triangular side-pieces are tufts of black silky vegetable fiber twisted into cords. A considerable remnant of these cords survives, in a half-decayed state, in the bore on the left. Extending from the two bores to the hollow on the back, where they are joined under the resin filling, these cords presumably served as a means of suspending the figure, perhaps as the central pendant of a necklace. On the other hand, the cords may have served to attach to the figure a little cape (*delantal*), such as was commonly provided for images of the gods.

The bottom of the figure shows plaited sandals on the feet, that on the right 31 mm., that on the left 34 mm. long. The genitals were originally modeled flat; an inlay of the glans is lost. To judge from two remaining fragments, the anus was originally represented by an eccentrically perforated disk of malachite, 2 mm. thick and 9 mm. in diameter, with sides inclined conically inward. The disk was fastened in place not only by resin, but by means of a wooden peg bound with fiber cords. The round hollow, 6 mm. deep, into which the malachite disk was set, cannot be distinguished in the X-rays. It may communicate with the hollow on the back.

The hollow on the back of the figure, thickly coated with resin, has a measurable depth of 15 mm. and a diameter of 60 mm., not including a resinous rim of 3.5 mm. all around. As the X-ray shows, this hollow, with its resinous filling, extends deep into the figure. The little spots which appear in this area of the X-ray indicate earthy particles in the resin. The filling, which considerably increases the weight of the object, may have been inserted in order to protect the wood against splitting. A dog's head from the old collection at Ambras Castle near Innsbruck, now in the Ethnographical Museum in Vienna, shows a similar resin-filled cavity.

Though the insertion of the resin in the hollow back of the figure may have represented a purely preservative measure, there is an alternative possibility. A greenstone figure in the Stuttgart Museum, which was acquired from the monastery of Weingarten at the time of its secularization in 1803,[7] shows Quetzalcouatl or Xolotl as a skeleton with a sun-disk on his back, over a symbolical representation of the jaws of the earth. Again, the representations of Xolotl in the Codex Borgia and related codices[8] show him with the name of the sun, "4 olin" (Codices Borgia, Vaticanus B), or accompanied by a figure leading the sun into the jaws of the earth (Codices Telleriano-Remensis, Vaticanus A, Borbonicus, and Tonalamatl Aubin). In the Codex Borbonicus this figure is again Xolotl. The greenstone figure in Stuttgart once also had inlays over the heart and the navel, like the Vienna figure. One might thus conclude that the cavity on the back of the Vienna figure formerly held a large inlay, possibly a sun-disk like that of the Stuttgart figure. However, the probable use of the object as a pendant on a necklace would seem to militate against this explanation.

Projecting from the navel of the figure's prominent belly

[6] For the X-rays, the writer is indebted to the kindness of Dr. J. Zakovsky, Director of the X-Ray Experimental Laboratory in Vienna.

[7] Fischer, 1904; Seler, 1908, Vol. 3, p. 392.

[8] Seler, 1904–09.

is a tiny head of jet, 14 mm. high, 6 mm. from front to back, and 7 mm. wide without the ears, which add another 3 mm. to the width. The elaborate inlays of this little head include eyes of mother of pearl, 3 mm. wide, with inset pupils of obsidian (of which that on the left is missing). The upper teeth in the open mouth are represented by two gashes in the lower edge of a trapezoid of mother of pearl, 2 mm. wide; and the tongue is formed of a tiny rectangular plate of red shell, 1 mm. wide. The X-ray shows that the plate forming the tongue is rather long and deeply imbedded in the mouth. The tip of the nose and the left half of the upper lip are broken away, perhaps through a fall, which would also account for the loss of an ornament once imbedded in a resin-incrusted hollow under the nose. Through perforations in the ears pass twisted fiber cords for the suspension of pendants, of which that surviving on the right consists of a minute perforated deltoid of yellowish green stone, 3.5 mm. long and 0.25 mm. thick. The soft stone of this pendant, which under magnification shows dark honeycombing in a pale mass, and which effervesces in hydrochloric acid, is probably Mexican onyx. Across the brow of the little head lies a headband 2 mm. wide, inlaid with three and a half triangles of turquoise (points downward), alternating with three triangles of malachite (points upward). The hair is represented by seven furrows above the headband and ten furrows below it. At the right end of the headband a knot is represented by means of a bit of red shell with a longitudinal groove, the loops being formed of a half-disc of turquoise above the knot and a rectangle of turquoise with a longitudinal groove below it. The continuation of the headband beyond the knot is suggested by a little rectangular plaque of turquoise. The right cheek is decorated with a diagonal band composed of two narrow plaques of turquoise, while the left cheek carries two plaques of malachite, of which the lower one is very short.

In its technical aspect the Vienna figure is without parallel among surviving Mexican antiquities. The nails of gold and silver, the fastening of inlays with wooden pegs, and the diminutive head carved in jet, with its tiny inlays, are features which do not occur on any other known specimen. Because of lack of comparative material it remains, for the present, impossible to determine the exact place of origin of the piece. The technique, in any case, implies a tradition of craftsmanship reaching back some hundreds of years.

Fully as interesting as its technique is the iconography of the piece. The little head peering from the navel scarcely has a parallel, unless the lost inlays of the greenstone figure in Stuttgart were similar. We may be reasonably certain that the figure is a representation of Xolotl.

Unfortunately, the sixteenth-century sources do not inform us very fully about Xolotl. Because of the name "4 olin" attached to Xolotl in the Codex Borgia, Seler identified him with Nanauatzin, a "foundling in the grass" in the sense of the Arapaho myths,[9] who bursts into full effulgence only on the fourth day. This fourth day is precisely the day "4 olin," the fifth day of the year 13-acatl, the birth-year of the sun. However, Xolotl is hardly a hero like Nanauatzin or the sun itself. He appears (in the Codex Borbonicus) as carrier of the sun, or (in Mendieta) sets the sun in motion.

In this connection, a pair of figures appearing on pages 49, 47, and 18 in the Mixtec Codex Vindobonensis[10] is of considerable interest, as showing a certain resemblance to the Vienna carving. These figures have torn-off dogs' ears, animal half-masks (perhaps jaguar masks?), long braids or knots, which in one figure are decorated with blue and green stones, in the other with golden bells (Fig. 30). These representations may perhaps shed light on the relation of Quetzalcouatl to Xolotl. In close proximity to these representations we find on page 48 in the same Codex Vindobonensis a number of forms of Quetzalcouatl arranged in pairs, one of

FIG. 30. Mythical pair of brothers from the *Codex Vindobonensis*, page 49. The figure on the right wears the hat of Quetzalcouatl. Very similar figures without animal masks occur on page 48 among the paired manifestations of Quetzalcouatl.

these pairs being decorated with ornaments very similar to those of the pairs on pages 49, 47, and 18. A commentary to a Mixtec picture-codex in the convent of Cuilapa,[11] which must have had a number of similarities to the Codex Vindobonensis, told of a pair of culture-heroes, or twins, who were apparently the same as the single Quetzalcouatl of the Mexican area. Because of lack of material, the whole question must be approached with the utmost caution. On the other hand, the very lack of sources increases the importance of the Vienna figure.

[9] Dorsey and Kroeber, 1903.

[10] Anonymous, 1929.

[11] Garcia, 1729.

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KARL ANTON NOWOTNY*
Museum für Völkerkunde
Vienna, Austria
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* Translated by Carl Schuster, New York.

NOTES ON THE ADENA ASPECT*

A new material trait of the Adena Aspect has recently been discovered in two mound sites in Ross County, Ohio, viz., tubular pottery pipes with a constricted mouthpiece. Similar specimens in stone are diagnostic of the aspect[1] but pipes made of pottery are unreported in either comprehensive analyses of Adena or the site reports in their bibliographies.[2]

The Renick group of mounds are situated 0.4 mile southeast of Chillicothe on the second terrace overlooking the Scioto River, and are on the property of the Aluminum Company of America. Mound I was 9 feet 1 inch high, had a diameter of 74 feet, and contained 32 burials, 2 subfloor tombs, and a house site. The skeletal remains were generally in an extreme state of decay, in some cases being discernible only as a discoloration in the soil. Mound II, 80 feet to the northeast, was 15 inches high and 30 feet in diameter. It covered a single partially disturbed extended burial in a subfloor tomb and was unaccompanied by material remains. Mound III lay about 250 yards east of I, was 40 inches high and 50 feet in diameter. This site was over two-thirds razed by construction workers before any examination could be effected. The sole feature of its partial exploration was a distinct floor line which showed slight evidence of fire upon its surface.

The second site was a small isolated earth mound, 3.5 feet high and 30 feet in diameter, located on the land of Samual Dresbach in the southwest quarter of Section 19, T1ON, Ross County, Ohio. It contained a single central inhumation accompanied by three tubular pipes of pottery. As in the Renick mounds the skeletal material was in an exceedingly poor state of preservation. However, a contributing factor was undoubtedly a previous partial exploration by unknown parties.

The tubular pipes from the Renick and Dresbach mounds are quite similar in their construction and physical appearance (Fig. 31). The tobacco chambers in all cases are slightly elliptical, conforming to their outside diameters, the result

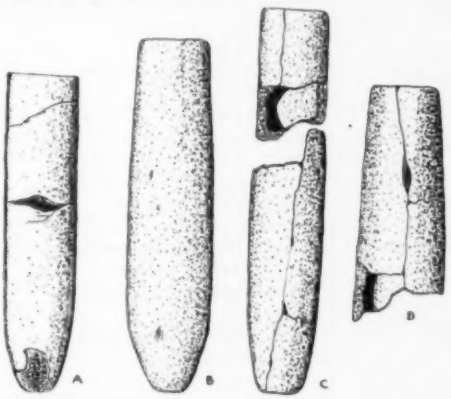

FIG. 31. Tubular pottery pipes from Ohio: *A*, Renick group; *B*, *C*, *D*, Dresbach mound.

of completed forming preparatory to firing. All of these pipes were crudely made and lack the finish and symmetry that usually characterizes their stone counterparts within the aspect.

The specimens with their proximal end intact all have a wedge-shaped or flattened mouth piece and exhibit a pronounced shoulder between the stem and the tobacco chamber. The two complete tubular pipes are 9.5 and 10.5 cm. in length. Outside diameters vary from 2 to 2.9 cm. and tobacco chambers have an average wall thickness of 0.35 cm. The color on their exteriors ranges from light tan to dark gray, the paste shading from reddish tan to gray. Temper-

* The writer is indebted to the Ross County Historical Society, which sponsored the explorations, and to Mr. Donald McBeth, who was in direct charge of the work, for generously making the material remains, field notes, and photographs available for study.

[1] Webb and Snow, 1945, pp. 85–6; Greenman, 1932, pp. 454–5.

[2] Webb and Snow, 1945; Greenman, 1932.

TABLE 28. TRAITS AT ROSS COUNTY SITES*

Webb's Nos.	Traits	Presence or Frequency	
		Renick Group	Dresbach Mound
	MOUND TRAITS:		
7	Mounds conical	x	x
8	Mounds one of a group	x	
11	Mounds built on their own villages	x	x
22	Primary purpose of mound to cover burials	x	x
—	Prepared floor of gravel	x	
	TOMB TRAITS:		
37	Pit tomb dug below earth surface	3	
40	Mound erected over subfloor tomb	x	
	HOUSE TRAITS:		
43	Post-mold pattern circular, diameter 60 feet or less	1	
44	Each post set in individual hole	x	
52	Floor areas discolored by heat	x (Md. III)	x
54	Fire basins in village, circular		2
	CREMATION TRAITS:		
70	Cremated remains deposited with extended burials in sub-surface pit	1	
	INHUMATION TRAITS:		
77	Body extended, in flesh on back, no tomb	26	1
—	Two extended bodies in same subfloor tomb	1	
82	Important central graves (three extended bodies in same subfloor tomb)	1	
83	Use of bark in graves	x	
84	Use of puddled clay in graves	x	
	FLINT TRAITS:		
101	Leaf-shaped blades or knives		2
102	Leaf-shaped blades deposited in cache	10	
104	Projectile points, stem with parallel sides	2	1
106	Projectile points, side notched	1	
109	Scrapers, thumbnail, flint	1	
	GROUND STONE TRAITS:		
111	Gorget, bar, expanded center (unperforated)	2	
	BONE AND ANTLER TRAITS:		
172	Spoons, carapace of terrapin	4	
	MICA TRAITS:		
—	Mica, small fragments, uncut	x	
	POTTERY TRAITS:		
191	Adena Plain	3	7
—	Pipes, tubular, constricted mouth (not including one specimen from the Dresbach Mound with its proximal end missing)	1	2

* Source: Webb and Snow, 1945, pp. 27–106.

ing material in every case is sand, which appears to make up about 50 per cent of the paste. The hardness varies from 2 to 3.

One specimen, that from the Renick mound, has a heavy incrustation of carbonaceous material in its tobacco chamber which could only result from the smoking of tobacco or some similar substance. While all four pipes accompanied burials, the Renick specimen was not associated with either of the important subfloor tombs in Mound I.

Table 28 lists the traits found at the two sites. It is evident from this table that the tomb, burial, and material traits, while typically Adena, reflect a singularly elementary manifestation of the aspect. The log tomb, which is often found and is characteristic of important burials, was totally absent. Material remains portrayed little of an aesthetic quality, and the sole indication of commerce was the presence of a few mica fragments from Mound I of the Renick Group. All artifacts found, with the exception of expanded bar gorgets, fall within Webb's listing of Archaic traits for the aspect.[3]

[3] Webb and Snow, 1945, opp. p. 213; also see pp. 218–19.

In typing both sites as Early Adena the only apparent chronological paradox is the prepared gravel floor of the large Renick mound. This trait, rare in Adena, reaches its florescence within the later Ohio Hopewell. However, with river gravel close by, the writer does not believe undue weight should be attached to such an artless and rudimentary feature.

The foregoing observations are largely based on negative traits and as such are open to criticism. They are presented to advance a speculative hypothesis embodying the facts as interpreted by the author.

Ford and Quimby[4] have postulated a fundamental correlation between Tchefuncte and Adena. Tubular pipes of pottery are diagnostic of the former culture,[5] and now their discovery in Adena tends to confirm this conjecture of a basic relationship either between the two societies or to a common parent. The question of whether or not these pipes were secured through southern contact or produced locally the writer is unprepared to answer.

From the foregoing discussion it seems reasonable to assume that the Renick and Dresbach mounds occupy an early chronological position within Adena and the presence of tubular pottery pipes strengthens the hypothesis of a strong southern influence, if not origin, for the aspect in its primary stage.

[4] Ford and Quimby, 1945, pp. 92–3.
[5] *Ibid.*, pp. 29–31.

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ROBERT A. KERCHER
Lancaster, Ohio
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BOOK REVIEWS

Archaeology of Alkali Ridge, Southeastern Utah, with a Review of the Prehistory of the Mesa Verde Division of the San Juan and Some Observations on Archaeological Systematics. JOHN OTIS BREW. With Appendices by ALICE BRUES and VOLNEY H. JONES. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. XXI. Cambridge, Mass., 1946. xv+346 pp., illustrations, bibliography, and index. $7.50.

The Archaeology of Alkali Ridge, Southeastern Utah is, beyond doubt, one of the best written most complete, and thought-provoking additions to the literature on American prehistory. Archaeological reports are usually little more than an inventory of work done and a record of the materials recovered. Little attention has been given to an exposition of the thought processes and methods involved in making analyses and to the premises upon which conclusions are based. Brew's work is not of this kind. Instead it is a thorough analysis of the historical, ecological, and theoretical background against which his particular researches are placed. This fact is well brought out by the early chapters with the headings "Physiography and Ecology," "The History and Extent of Mesa Verde Archaeology," "The Development of Formalized Culture Classification in the Southwest," "The Use and Abuse of Taxonomy," "The 'Pueblo Invasion,'" and "The Present Situation." These topics, in themselves, and especially the section dealing with systematics, would have merited publication without the subsequent report on the digging. In a way, it is too bad that the introductory chapters were not given the prominence they deserve by separate publication under a compelling title, for the content is somewhat obscured by the main title of the monograph.

Brew hurls a number of bombshells, but always from a fair vantage point and with full warning that they are coming. As if he could not wait until the body of the report, the first one is launched even before the Table of Contents. Just when Southwestern archaeologists—to say nothing of others—are becoming familiar with the term "Anasazi" as a replacement of the former double label, "Basketmaker-Pueblo," Brew now recommends that the Navaho word "Anasazi" be dropped once and for all and that the label "Pueblo" be substituted (or "Puebloan" as suggested by Dr. Kirk Bryan). I doubt if many people would raise a voice against this since "Pueblo" has come to have a fairly fixed meaning in both professional and non-professional minds. Its usage, however, immediately calls for a qualifying term to make clear archaeological or ethnological reference. One of the advantages of "Anasazi" is its designation of archaeological horizons. This, however, is not a serious objection. The proposed change in terminology is a subject which might well be discussed in a future conference of Southwestern archaeologists.

The work on Alkali Ridge was originally inspired by a gap in the Pecos system of cultural classification. This void, called Pueblo II, was interposed between Pueblo I and III partly on logical grounds and partly to accommodate certain vaguely known materials whose chronological position had not been supported by digging although it was intermediate typologically. Thus "... the Peabody Museum Southwestern Utah Expedition was inaugurated with the aim to define the culture of Pueblo II or to eliminate it from the Pecos Classification" (p. 3). The first objective of the report then deals with this topic. Brew's second objective "... questions the usefulness of our archaeological systematics as applied at present and attempts to evaluate ... schemes which have been erected in the Southwest since the expedition was organized" (p. 3).

That portion of Brew's book which one hears discussed most frequently, dealing specifically with the second of these problems, is his chapter on "The Use and Abuse of Taxonomy." It is made clear at the start that the attack is not on taxonomic methods as such, but upon the classificatory systems applied to specimens and culture complexes and the failure to understand the methods and their limitations. No one will disagree with the accusation that archaeologists as a whole have been lax in carefully examining and stating the theoretical bases, the assumptions, and the mechanical processes of the systems of classifications set up by them. The prodding administered by Brew should have salutory effects.

The attack on our systematics goes into high gear following a summary of the concepts on which classification systems are based. This summary includes the statement "Our systematics has been borrowed and adapted from biology" (p. 46). The archaeologists' misconceptions and misapplications of his analytical tools are blamed on the fact that he has failed to recognize the difference between inanimate objects and living organisms where genetic relationships exist. As a consequence the problems have been greatly multiplied rather than simplified. Brew draws heavily upon biological opinion in a lengthy search for the logical foundations upon which taxonomic systems are based, as a means of clearly separating the fundamentals peculiar to biology and archaeology. This excursion into natural science has prompted me to seek the opinion of a colleague in biology, Dr. Charles Reed, from whose memorandum the following comments are taken:

Brew's conclusions that the biological type of classification, supposedly based on phylogeny, is necessarily different from archaeological classification is correct, even though he does not understand the ideal sought for by the modern biologist in taxonomy.

1. Brew states that anthropologists in general believe that biological classification is based on phylogenetic trees, and that anthropologists have tried to copy this procedure, in concept and practice.

2. Brew states that biological classification actually is *not* based on phylogeny and cannot be, that biologists are coming to realize this, and that biological classification consists merely of handy pigeon-holes into which to stuff similar-appearing objects.

Therefore, according to Brew, even if anthropologists were to copy the type of classification biology has, they would not be copying a phylogenetic classification, but merely a series of arbitrary arrangements.

a) Brew's estimation of modern biological classification was seemingly gained from reading certain articles in only one book, *The New Systematics*, 1940. From these articles he gained the idea that phylogenetic conclusions are impossible and that even such a fundamental concept as the biological "species" depends upon an arbitrary decision of the individual taxonomist. In this same book, Diver's chapter on "The Problem of Closely Related Species Living in the Same Area," as well as several other

chapters, should have led Brew to doubt his original assumption. Diver says specifically (p. 304), "The relationship established by the taxonomist is, in fact, genetic," and Darlington discussed (p. 148) several species that had escaped the old-fashioned taxonomist but have been recently established on purely genetic bases.

b) Brew seemingly did not avail himself of several recent books which discuss modern ideas on biological classification at some length. Dobzhansky, *Genetics and the Origin of Species* (second edition, 1941) and Huxley, *Evolution: The Modern Synthesis* (1942) both clearly state the phylogenetic ideal in biological classification, discuss speciation as a definite ecologic, physiologic, and genetic phenomenon, and point the way to genetic analysis of speciation in living plants and animals. Further, such analysis of wild populations to determine taxonomic status is being accomplished, by direct examination of the chromosomes where possible (Dobzhansky and Epling, *Contributions, Carnegie Institution of Washington*, Vol. 554, 1945 is one example), but by more indirect genetic observations, experiments, and statistical procedures where giant chromosomes are not available for study (for example, see Miller, *University of California Publications in Zoology*, Vol. 44, pp. 173–434, 1941), or consider the classic situation of overlapping, but non-interbreeding, populations within a single species, as exemplified by the Great Tit (*Parus major*) in the Anum drainage of northeastern Asia (discussed by Huxley, *Evolution: the Modern Synthesis*, p. 244).

Taxonomy in modern biology *does* seek the phylogenetic ideal, based on genetic analysis. True, this analysis is in many instances difficult, will take a long time to realize for each kind of plant and aninal, and, for paleontology, is at present impossible. It is also true that for most species today we assume that the degree of morphologic similarity indicates the degree of genetic relationship. This assumption, genetic analysis may or may not uphold in each case (but it usually does). We know also that determinations of taxonomic groups are, today, mostly the results of arbitrary decisions of taxonomists, but, upon suitable analysis by the ecological geneticist, the taxonomists are usually found to have been right.

Thus I cannot agree with Brew that biological taxonomy is, and always will be, arbitrary pigeon-holing.

Brew has a few things to say about terminology, too, a hand maiden of taxonomy. He rightfully objects to the usage of "genetic" with reference to cultural descent, a word which implies that gene transmission is a part of cultural progression. This is obviously a term of restricted usage, referring to protoplasmic continuity between generations of living forms. Similarly, "hybrid," "lineage," "family-tree" are all suspect and should not be used. These follow logically in the taxonomic systems now in vogue in the Southwest because these systems were derived by applying biological classificatory schemes. Yet, one wonders if the damage supposedly done by the use in archaeological parlance of terms familiar in biology has been as great as is supposed. I do not think for a moment that an archaeologist setting forth a "family-tree" of culture, is either presenting his colleagues with a "dangerous distortion" of facts or is indirectly telling them that he believes biological factors are the controlling ones. He is using a device to present an idea or an hypothesis and the translation of the terms from biology to archaeology would appear to present no great hurdle. Objection is also voiced against the word "evolution" as applied in a cultural sense. The dictionary does not restrict its meaning to the concept of organic evolution. It can be applied validly to change with the passage of time of either horses or houses. It strikes this reviewer as an economical and useful means of expressing precisely what happens.

In one respect, particularly, it seems to me that Brew errs. I refer to the imputation that those archaeologists who have set up taxonomic formulae believed their products to be the "ideal-complete-system." By actual experience those examples which he cites have been changed and revised as new situations arose. I fail to see that systematization has been regarded as finite, or that change was inimical to the system.

I also find myself at variance with Brew in his condemnation of charts and diagrams as an aid to exposition. These are said to be simplifications and distortions. Simplifications, yes, but they need be no greater distortions than exposition by word. Both are abstractions in the final analysis. As one who has made use of illustrative devices in the past I decline to be chastened and shall probably continue to "confuse" the issue by whatever means available to clarify, at least to my mind, the problem at hand.

Having demolished the existing taxonomic system currently in use by Southwesternists and pleading at the same time for more classification rather than less—the question logically follows, "What did Brew do with his own material?" In the first instance he did actually make use of current systems, at least in part, and all to his credit. In the section "Architectural Analysis," the taxonomic positions of different units are stated in terms of the Pecos Classification, the Gila Pueblo System, and the Museum of Northern Arizona System. This is an aid to the specialist but at the same timeit must impress the novice with the terminological divergences that now exist. In the minor arts there is understandably a less explicit assignment in these systems. The ceramic analysis is a much needed and superb piece of work from both type and trend standpoints. Pueblo II forms are immeasurably clarified, thereby accomplishing what was one of the original objectives of the Alkali Ridge work. I suspect, however, that there may remain some important questions in the minds of those who have studied San Juan ceramics, as for example, the differences between Escavada Black-on-White (Chaco I transitional) and Mancos Black-on-White, and just where in time certain changes in the ceramic continuum took place.

One's understanding, in fact, of the over-all cultural succession is made difficult by Brew's adherence to the "narrative approach," although this is in harmony with the philosophical attitude he holds toward his work. Sifting the narrative for wanted data and relating these in turn to illustrations is a tedious and time-consuming procedure which has, to a very real extent, been overcome by those who use the outline type of description with closely associated illustrations.

Alkali Ridge is so packed full of all manner of problems which are subject to review that it becomes difficult to choose between them. I shall content myself finally with a few further comments relative to the Mogollon culture, to which Brew gives due but highly skeptical attention. Let me say that I am entirely with him when he claims that we must entertain a critical point of view towards our studies. But our paths begin to separate somewhat when we assess the data. In evaluating the status of Mogollon as a "basic culture," Brew says (p. 77), " . . . status questionable, very few undisputed distinctive traits in comparison with the Pueblo and the Hohokam; number of sites small." The assumption here is that to be recognized as a "basic culture" Mogollon *must* be as distinctive in kind and in richness of traits as was the culture of the Pueblo and Hohokam.

Knowing well that differences in the level of attainment among people do exist, this conclusion does not logically follow. In fact we shall, in all probability, have many fewer traits by which Mogollon may be characterized than are available for the other groups even after years of work because of the very nature of the culture. This "negative" evidence in itself will have some meaning.

The final statement in the above quotation to the effect that the number of sites is small, needs qualification. While I have not accurately surveyed the literature, there are today as many—if not more—Mogollon site reports extant than there are for the Basketmakers. The implication of this is that sites are neither scarce nor difficult to find. One wonders if Brew would have included this statement had he written *Alkali Ridge after* his Upper Gila reconnaissance which is now in progress.

In the appraisal of the Mogollon culture a somewhat different concept would have been achieved had sufficient recognition been made of:

1. Its geographic scope, in which it compares favorably with the other "basic" Southwestern cultures.
2. The regional developments (branches) within this larger area which yield local but synchronous chronologies.
3. The determination of Pueblo-Mogollon difference in as early a time level as possible and not in the later horizons when differences were being leveled off by contact.

This information is on record in publications with dates well before 1945, which represents the most recent bibliographic reference in the book.

Brew laments certain trends which Southwestern archaeology has taken, and he obviously includes Mogollon as one of the least desirable developments. Yet, a number of workers have seen the need for the recognition of a new cultural form. It is either this or a drastic overhauling of the "San Juanist" concept. I am certain that he would not have us wait with our proposals until all the chips are down. If we had, his report would have been shorter by many pages and with much less thought-provoking discussion.

In spite of the apparent conflicts between us, I wish to reiterate my admiration of this thorough and monumental book. It ranks high among the works produced on Southwestern prehistory and sets a laudable example for other archaeologists. I cannot however refrain from expressing my deep curiosity as to how Brew will attack certain cultural problems which are bound to arise in the course of Peabody Museum's Upper Gila project.

EMIL W. HAURY
University of Arizona
Tucson, Arizona

An Early Pit House Village of the Mogollon Culture, Forestdale Valley, Arizona. EMIL W. HAURY and E. B. SAYLES. University of Arizona Bulletin, Vol. XVIII, No. 3; Social Science Bulletin, No. 16. Tucson, 1947. 93 pp., 34 figs., 9 pls. $1.25.

This monograph is the second report in the series on excavations in the Forestdale Valley, Arizona conducted by the University of Arizona and the Arizona State Museum. The first report presented the results of two seasons' excavations at the Bear Ruin, a pit house village dating about 700 A.D. and representing a marginal manifestation of the Mogollon culture with considerable admixture of Anasazi traits. This second report presents the results of excavation at the Bluff site, another pit house village, but dating about 300 A.D. and representing during the major part of its occupation a relatively pure manifestation of the Mogollon culture, known as the Hilltop Phase. Together the two reports cover a dated local sequence of culture extending in time from about 300 to 800 A.D. and comprising a transition from the relatively pure Mogollon of the Hilltop Phase through the later Cottonwood, Forestdale, and Corduroy phases wherein Anasazi traits gradually were gaining ascendancy. Thus there is covered an unusually long dated sequence replete with interest for its story of culture change and cultural blending.

Twenty-three houses were excavated at the Bluff site and these, together with the artifacts and other evidence located therein, provide the basis for the delineation of the Hilltop Phase, the earliest dated phase of the Mogollon culture, as well as the Cottonwood Phase, the next earliest phase of the Forestdale Branch. Paraphrasing Haury, the Hilltop Phase is characterized by round to oval houses excavated into bedrock, with lateral entrances, unspecialized hearths, and floor pits. The economy is predominantly food-gathering and agricultural, the pottery entirely plain ware; no decorated types are present. The stone tools are a combination of simple and well developed types, both basin and trough type metates, and manos ranging from U-shaped pebbles through oval shapes to sub-rectangular. Mortar-metates, pestles, pebble mortars, tubular pipes, and choppers, all characteristic of the Mogollon culture, are present. Burials are semi-flexed without offerings.

The importance of this report appears to the reviewer to be two-fold. On the one hand, the data described add to the ever-increasing amount of evidence delineating the early phases of a relatively homogeneous Mogollon culture developing out of the still more basic Cochise tradition. The above characterization of the Hilltop Phase could apply equally well, with minor local variations, to either the Pine Lawn Phase of the Mimbres Branch or to the Penasco Phase of the San Simon Branch, and by the deletion of pottery and a very few of the developed stone artifact types there remains something very close to the late Cochise stages. The significance of the delineation of a cultural continuum of such length as the Cochise-Mogollon tradition cannot be overemphasized. At present it is one of the longest dated sequences in the New World and it will be of considerable importance in the study of cultural dynamics in the American Southwest. This point seems well made by Haury.

On the other hand the data seem equally significant where they apply to the blending of the Mogollon culture in the Forestdale Valley with the Anasazi culture. With the excavation of each additional Mogollon village such as this one, it becomes more apparent that the Mogollon branches in their later phases became quite receptive to traits from Anasazi, Hohokam, and other "foreign" cultures and gradually blended with them in different degrees. As the northernmost of the Mogollon branches so far investigated, the

Forestdale Branch was the most receptive to Anasazi traits, beginning with the Cottonwood Phase, in contrast to the more pure Georgetown and Dos Cabezas phases of equivalent time level, centering further south. For this reason the Forestdale Branch is of unusual importance and interest in the study of early relationships between the Anasazi and the Mogollon cultures. In this connection the absence of Anasazi pottery in these early fourth-century Hilltop Phase houses indicates the possibility that the Mogollon peoples began to make pottery before the Anasazi.

The use of the outline format rather than text for the presentation of detailed field data such as the description of architectural details, and the use of text for the discussion and summary sections, make this report as eminently useful as Haury's previous reports on the Mogollon culture, both for the casual reader, who may not be interested in such details but is interested in generalizations, and for the specialist in the field, who must use the detailed data for comparative purposes.

On the other hand, the reviewer feels that some improvement could be made in the reproduction of the photographic, or half-tone illustrations, particularly those of houses. Floor details such as post holes are difficult to locate, and in some instances the corners of house floors have been cut off, although such extraneous details as dirt piles and stripping trenches were left in.

From the point of view of the facts presented there is also one minor criticism. A chart is provided (p. 85) which correlates "the phases in the three branches recognized at present as beginning the Mogollon Complex." In this chart the Cerros Phase is omitted from the San Simon Branch, without explanation. This discrepancy with the chart published in Sayles' report on the San Simon Branch is puzzling and the reasons for including the Cerros Phase in another phase (the Encinas?) should have been given.

On the other hand these minor faults do not detract from the general excellence of the whole report and it is to be recommended to all those interested in the field of American prehistory as necessary reading. It is interesting and easy to read; the material is well presented; and the data are extremely significant for their bearing on the prehistory of the American Southwest.

JOHN B. RINALDO
Chicago Natural History Museum
Chicago, Illinois

The Jornada Branch of the Mogollon. DONALD J. LEHMER. Foreword by EMIL W. HAURY. University of Arizona Bulletin, Vol. XIX, No. 2; Social Science Bulletin, No. 17. Tucson, 1948.

This publication fills a void which has existed in Southwestern archaeology as to the extent of cultural development in a peripheral region, the area from Villa Ahumada, Mexico, north to Carrizozo, New Mexico, and from 75 miles west of, to 150 miles east of, El Paso, Texas. Lehmer has covered this wide area and brought order to the cultural sequence by a careful selection of sites to be tested and surveyed.

The earliest phase of the Jornada Branch is the Hueco, which occurs throughout the region and is non-ceramic, agricultural, and food gathering, with a fairly well developed wood, fiber, and stone technology. The Hueco Phase lasted until *ca.* 900 A.D. Lehmer notes that there are similarities between this group and the Cochise and Basketmaker; it is probably a local manifestation of the Cochise.

After Hueco times we find a northern and southern division of the area, with each division having three succeeding related phases. The sequence in the south is Mesilla, Dona Ana, and El Paso; that in the north, Capitan, Three Rivers, and San Andres. These phases have been distinguished mainly on the basis of pottery and architectural features. Their terminal date has been set *ca.* 1400 A.D. All of the phases of the Jornada Branch are a blending and mixture of Anasazi and Mogollon traits, but they seem to have a stronger southern (Mogollon) flavor than northern (Anasazi).

It is obvious from the report that the survey and excavations were carefully done. The first six weeks of the work were devoted to a survey in which a sequence was built up via seriation. The excavations, three in number, "were directed at amplifying and confirming the survey sequence" (p. 11). The Alamogordo site materials excavated by Wesley Bradfield under the joint sponsorship of the School of American Research and the University of Kansas in 1929 and by Stanley Stubbs in 1930 are also incorporated.

With this publication, we are again faced with the problem of whether Mogollon has an autonomous standing in Southwestern archaeology or is merely a part of an interrelated functioning whole which developed through time and space in the general culture history of the Southwest. Nesbitt[1] and Kidder[2] believe that Mogollon is a variant of Anasazi, but that in considering the problem one should take into account the development of, and influences from, the Hohokam. Lehmer and others, on the other hand, consider Mogollon a separate entity.

Although a review is not the best place to develop such a theme, nevertheless I would like to criticize various contentions made by Lehmer in his conclusions which, in my opinion, do not give convincing proof of the distinctness of Mogollon. It seems to me that the arguments used by the pro-Mogollon group are based on very little evidence and that they suffer from the same fault of which Lehmer accuses his opponents: bad logic.

Lehmer has put forward the main premises of the pro-Mogollon group. (It should be noted at the outset that the Mogollon culture has not been well-defined and it is therefore hard to say just what it really is.) He states first of all, that it can be demonstrated that Mogollon antedates Anasazi. Here, there is confusion because of the preexistence of the terms Anasazi and Mogollon. Taking the viewpoint that Mogollon *is* (a reality) and Anasazi *is* (a separate entity), one would grant that one antedates the other in Mogollon's (probable prior) acquisition of pottery and corn, that is, as far as we now know. However, one need

[1] Paul Nesbitt, "The Starkweather Ruin, New Mexico," *Logan Museum Publications in Anthropology*, Bulletin No. 6, Beloit, 1938.

[2] Alfred V. Kidder, Review of *op. cit.*, *American Anthropologist*, n.s., Vol. 41, No. 2, pp. 314–16, Menasha, 1939.

not also assume that culture history in the Southwest began with the advent of agriculture and pottery. It is not said that Basketmaker is non-Anasazi because it antedates Pueblo; instead, the two are considered as belonging to the same unit because of their cultural continuance and geographical unity. The geographical factor as a basis for separation loses its significance when we see that the conditions affecting the Mogollon and the Anasazi are basically the same. Assuming that the agricultural and the ceramic influences came from Mexico, we would expect the group nearest the area from which the impulses came to have incorporated them into their culture first. Just because the peoples in the Mogollon area did not develop what they received to the degree that the Anasazi did, after they received the traits, does not indicate separate origins.

If one would use the term "Mogasazi," or any other term for the Basketmaker-Pueblo and the Mogollon, and consciously view these groups as an intra-functioning unit, it would be seen that through time and space they show a parallel development from a similar base. It must be admitted that the peoples of the Mogollon area, after the initial inception of this culture complex, suffered from cultural lags; however, on the return swing of culture from the north development was again stimulated. This is not a complete discussion of the intra-cultural contacts which were taking place between the northern (Anasazi) groups and the southern (Mogollon). The Hohokam influences that were continually being felt have been slighted. However, it does show that Lehmer has not considered all the facets of the problem.

Lehmer's second point is that the Mogollon grew different varieties of agricultural products than did the Anasazi; he uses Carter's work[3] as the basis for this statement. This seems to be very meager evidence for assuming that Mogollon is a separate entity from Anasazi, for we know that in the Anasazi itself various groups grew different varieties of products. At the present time the interrelationship of the agricultural products, their development and presence or absence in the various Southwestern groups, is not well understood and so should not be used as conclusive proof in any argument. Volney Jones[4] has shown that there is much to be desired in Carter's work; hence, he is not the best authority on which to base argumentation or logic.

Finally, Lehmer says that Mogollon can be recognized within a limited geographical area in various local forms which have different degrees of foreign admixture but stand together in typological contrast to the Hohokam and the Anasazi. This statement prompts one to ask what "stands together," and from what viewpoint is the problem being approached? What does Lehmer mean by "different degrees"? The same statement might be made for the Rio Grande or the Mesa Verde Pueblo areas. I believe that a bit of ethnocentricism has entered into the argument, and that Lehmer is looking out from a small area instead of over the whole Southwest.

The Mogollonists have been influenced greatly by the existence of Cochise and base much of their theory on this fact. Because in pluvial times there is no sign of the coexistence of Anasazi and Cochise, does not negate the possibility that a process like that which occurred later with the introduction of agriculture and pottery was not going on between the southern (Mogollon) and the northern (Anasazi) areas. Also, the picture has been colored by the fact that in Basketmaker sites, wood, fur, feathers, fiber, etc., have been found, which is not true of comparable sites in the Mogollon. After removing the perishable items from the Basketmaker assemblage we see that there are many similarities between the Mogollon and Anasazi prior to 700 A.D. The Mogollonists now admit that the culture of the Mogollon area from 700–1400 A.D. was a blend of both Anasazi and Mogollon, being predominantly Anasazi. The question now revolves around the earlier cultural developments in the Southwest. For the reasons stated above, I am a little skeptical of Lehmer's conclusions as to the nature of the Jornada Branch. His Hueco Phase is a pre-pottery horizon but dates late (ending *ca.* 900 A.D.), with the following phases representing a blend of many things. Since the term Mogollon does not have a clearly defined meaning, and the Jornada Branch has affinities to other areas, I believe it is hazardous to place the latter in any clear-cut category at this time.

HALE G. SMITH
Museum of Anthropology
Ann Arbor, Michigan

[3] George F. Carter, "Plant Geography and Culture History in the American Southwest," *Viking Fund Publications in Anthropology*, No. 5, New York, 1945.

[4] Volney Jones, Review of *op. cit.*, AMERICAN ANTIQUITY, Vol. 11, No. 4, pp. 262–5, 1946.

Archaic Sites in McLean County, Kentucky. W. S. WEBB and W. G. HAAG. Reports in Anthropology, University of Kentucky, Vol. 7, No. 1. Lexington, 1947. 46 pp., 11 figs.

This is an excavation account of four archaeological sites in the general vicinity of the Green River drainage, McLean County, Kentucky. Two of the sites are shell middens, one a cave shelter deposit, and one a small midden without shell on a bluff top. All were rather small sites, and none of them was deeper than 4 feet. Each site was carefully excavated in arbitrary blocks and levels.

Culturally they are similar. One site, McL-8, yielded very little material; but the artifacts found in the other three sites link them closely. Such features as hearths filled with and surrounded by burned and disintegrated stones, and buried caches of heavy stone tools, indicate that the former inhabitants of all the sites practiced a similar economy. It is the contention of the authors that all are, primarily, stations of a pre-horticultural, preceramic people. As such they belong to the Archaic Pattern, as this is known in the Southeastern United States. This interpretation is well borne out by the artifact and trait assemblages, which include tightly flexed and round-grave burials, large stemmed and notched projectile points, a variety of atlatl weights, full-grooved stone axes, conical stone pestles, stone beads, bi-pointed bone points, antler projectile points, and atlatl hooks and handles.

I do not believe that there can be any serious objection to dating these sites, at least *in part*, in the Archaic period or stage. There is a serious question, however, as to whether or not we can consider them as being fully within this time horizon. There is, in three of the four sites, a dilemma in the presence of pottery. Both shell-tempered and grit-tempered types are found in the midden refuse. This conflicts with the Archaic assignment, as is discussed by the authors in some detail. The shell-tempered pottery is clearly Middle Mississippian and does not raise the problems that are brought to the fore by the grit-tempered material. Middle Mississippian material on these sites, representing as it does the opposite end of the time scale with relation to the Archaic, can be accepted as the result of late reoccupation or intrusion. The Woodland-like grit-tempered pottery, commonly dated from the middle period of Southeastern prehistory cannot be so confidently treated. In considering this matter, Webb and Haag begin to question other aspects of their interpretation.

It is readily apparent that some of the shell-tempered sherds are of more recent origin than the bulk of other artifactual material in the sites, but this statement cannot be made with such confidence for the grit-tempered wares. Admit edly, there are only a few sherds of a type, such as O'Neal Plain, which can be shown to have occurred on the other shell heaps at a time when the typical shell-heap peoples still occupied the sites. There is no evidence at any of the three sites, but since there is a large amount of pottery remains that might be considered as Woodland, there should be some other artifacts within the assemblage that could be equated as coeval with the Woodland pottery. Perhaps this statement invalidates some traits listed as belonging to the Archaic, but it is readily apparent that many of the traits having a common or wide-spread occurrence in shell heaps are also an integral part of Basic Woodland material. For example, fully-flexed burials, stone gorgets, solid boatstones (atlatl weights?), stemmed projectile points, antler headdresses, and cremations, among others. The shell heaps of the Green River Basin in Kentucky do not show the great depths of midden characteristic of those of Northern Alabama. There are several more focal traits present in Kentucky that are relatively nearer to Woodland in typology than those characterizing the Lauderdale Focus. These are red ochre in graves, winged bannerstones, thumbnail scrapers, perforated bone awls, and perforated conch-shell sections. Consequently, it may be valid to assume that the Indian Knoll Focus is later than the Lauderdale and the presence of grit-tempered pottery of early Woodland type on these Kentucky sites is marking the first appearance of pottery in this area (pp. 43–4).

The difficulties here are, of course, the same ones which plagued Webb and his collaborators in the monumental Pickwick Basin report. In attempting to conceptualize his data into the compartments of the Midwestern Taxonomic scheme (i.e., Archaic, Woodland, Mississippian) he has, it seems to the reviewer, created unnecessary difficulties for himself. Refuse depth was lacking on the Green River sites so that cultural change and stratigraphy are not correlated in the remarkable fashion which they were in northern Alabama. Lacking this depth there is an obvious inclination in the present report to lump everything into a single classificatory group, the Archaic. Those features which stand in too great a violation of this are considered as late intrusives. At least two of the McLean County sites showed rubbish accumulations as much as 3 feet deep in some places. As this material was excavated in 6-inch levels, one wonders if it was not a mistake to fail to analyze and classify the artifacts by such depth proveniences. Such a treatment might have resulted in a clearer picture of the sequential introduction of new elements, ceramic and non-ceramic, into the depositional history of the sites.

As their whole concluding section shows, Webb and Haag are aware of the conflict in interpretations. I am inclined to agree with the second of their alternative conclusions, that "the shell-heap people used grit-tempered pottery" (p. 45). This would mean that in the centuries following the Archaic such wares as O'Neal Plain and the Baumer-like fabric-impressed type were made or possessed by the Green River inhabitants. Their culture, like that of all of the other peoples of the Southeast, was gradually being transformed by the currents of change that registered their varied effects from region to region throughout the area. The term and concept "shell-heap peoples" is, in this instance, misleading and confusing. It appears to be used to refer to the Archaic-level inhabitants who lived along the rivers and depended largely upon a shell-fish diet, but it should not be overlooked that these same shell refuse mound locations were occupied and added to by other people, probably descendants of the Archaic groups, who possessed a culture that can be distinguished from the Archaic but, nevertheless, held much in common with it.

GORDON R. WILLEY
Bureau of American Ethnology
Washington, D. C.

The Fisher Site, Fayette County, Kentucky. W. S. WEBB and W. G. HAAG. Reports in Anthropology, University of Kentucky, Vol. 7, No. 2, Lexington, 1947. 104 pp. 19 figs.

Professor Webb, more than any other student of Eastern prehistory, has thrown light upon the intricate problems that surround the relationships of Adena to Hopewell and of both these complexes to the old Archaic base which underlies them. The present paper, written in collaboration with Haag, continues in this fine tradition of factual presentation and interpretative insight.

The Fisher report is a discussion of a ceremonial unit, a burial mound which was one of several major features of an Adena group. The well-known Mt. Horeb Earthwork, the Peter Village, and another earthwork circle compose the total aggregation. Previous excavation by the University of Kentucky revealed a circular pattern of paired postmolds beneath the Mt. Horeb unit. In other publications Webb and his associates have demonstrated this structural pattern to be conclusively Adena. The Fisher mound, thoroughly excavated and meticulously reported upon, confirms the Mt. Horeb dating and adds to our knowledge of Adena burial practices.

The mound and its contents form a neat unit, and Webb is at his best in this sort of exposition and interpretation. By careful item for item analysis he demonstrates not merely the Adena identification but places the site more specifically as Late Adena. Although the Fisher site is a "closed unit" from the excavator's standpoint, the treatment is completely dynamic. There is an admirable appreciation of the continuity from Adena into Early Hopewell of the various artifact types and burial customs which link and differentiate both. This phase of the study is

cross-referenced to the Ohio Tremper Mound, an Early Hopewell site. There is also an awareness of the temporal range and distribution of some of these same traits back into the Archaic horizon. The appraisal of the copper "boatstone," the copper antler headdress,[1] and the "modified tubular pipes,"[2] showing their significant position in the developmental chain of Archaic-Adena-Hopewell, is as skillful as Kroeber's perceptive injection of a time-sense into the Uhle collections of Peru.

It is, indeed, paradoxical that in dealing with what is essentially a unit collection, the data and materials from a single burial mound, Webb is both sound and stimulatingly intuitive in the presentation of a developmental picture. Classificatory dogma do not seem to bother him. Yet in analyzing and reporting upon stratified refuse deposits, a situation inherently more suited to a dynamic interpretation of culture flow and growth, he has had a tendency to stumble upon the rigid barriers of taxonomy and to proceed less surely (see *Archaic Sites in McLean County, Kentucky*, reviewed above).

GORDON R. WILLEY
Bureau of American Ethnology
Washington, D. C.

The Flint River Site, Ma°48. W. S. WEBB and DAVID L. DEJARNETTE. Alabama Museum of Natural History, Museum Paper, No. 23. University, Alabama, 1948. 87 pp., 35 figs.

As a background for this report on a shell mound excavation in northern Alabama, Webb and DeJarnette begin with a methodological explanation of a generalized chronological scheme applicable to this and similar sites along the Tennessee River. Six periods are established upon correlated stratigraphic evidence. These are named "Archaic 1, 2, and 3" followed by "Pottery 1, 2, and 3" in that order. It will be noted that this is a distinct departure from Webb's and Webb and De Jarnette's previous approach to the deep, stratified river shell heap sites. Here, they are following the successive stages of the story in the ground and formalizing this succession into a temporal-classificatory scheme; previously, they had attempted to fit their stratigraphic results into a general taxonomic-classificatory system. For the interpretation of the site at hand, an 8- to 10-foot shell refuse pile at the confluence of the Tennessee and Flint rivers, their present methodological outlook seems much more fortunate. As an over-all chronological framework for the Tennessee Valley sites, their scheme is empirical and useful.

Each of the six periods is defined, in its inception, by the appearance of a new and distinctive artifact type. Each period closes with first appearance of the new type or type series which marks the beginning of the succeeding period. Archaic 1 is, thus, negatively defined as the period of human occupation without flint artifacts; Archaic 2 is ushered in by the introduction of large, ovate flint blades; and Archaic 3 is marked by the first steatite and sandstone vessels. The Pottery 1 period is opened by the earliest midden finds of fiber-tempered pottery; Pottery 2 begins with the first grit-tempered wares; and Pottery 3 has as its initial marker the trait of shell temper. There is a clear insistence that these periods are not defined by content or by the time-duration of any artifact type; they are simply the intervals between the respective inceptions of distinctive artifact types. Many of the types have a considerable upward continuance into successive periods. For example, flint blades last throughout most of the sequence; stone vessels continue after the introduction of fiber-tempered pottery; and the latter has a life-span which overlaps with the grit-tempered wares. What Webb and DeJarnette have really defined are not so much archaeological periods as a series of important horizon markers which enable them to correlate temporally a number of sites in the Tennessee Valley area. This is sound as a method, but the objectives are limited. A sequence of archaeological periods must, eventually, be more than a means of effecting time correlations from site to site or region to region. Not only is content necessary for the proper interpretation of past cultures but the relative frequencies of artifact types, the speed of replacement of one tool by another, and the trends of modification that occur must all be synthesized into period constructs.

This is not to imply that the authors of the Flint River report are not cognizant of these factors nor of the limitations inherent in the method which they employ here. Webb specifically states that the carry-over of marker types from their proper period into later periods has significance in indicating a continuity both of culture and population at the various shell mound sites. This leads him to make the interesting observation:

> Because of the cultural continuity manifested in these great middens, some of which may represent centuries of occupancy, and in the light of the observable development and differentiation among these time zones, it becomes difficult to believe that the so-called Woodland manifestation as it appears in the Southeast could have had any other origin than the Archaic people who dwelt on shell middens such as occur along the Tennessee River in Alabama.

With the exception of the important trait of cord or fabric-marked pottery, the reviewer is in agreement.

The Flint River midden was excavated in large, rectangular isolated blocks which provided controls for both arbitrary 6-inch levels and for natural depositional or soil zones. Intrusive pits, running from upper levels into lower ones were not, by this technique, eliminated. This has, apparently, led to considerable mixture in pottery types, confusing them with relation to their proper vertical contexts. If smaller horizontal controls had been employed, say 10- by 10-foot blocks instead of the 25- or 30-foot units, it is quite possible that the results of some of the blocks would have been much more clear-cut, as the chances of pit intrusions would have been greatly minimized. This

[1] Deer antler headdresses, without copper, appeared in the Belle Glade site, south Florida. Here, though occurring on a much later time horizon, their presence substantiates Webb and Haag's thesis that this general type of ceremonial headdress harks back to the Eastern Archaic. Many aspects of Florida Glades culture are definitely Archaic from point of view of typology (Willey, unpublished ms.).

[2] A burial mound near Moundsville, West Virginia, the Natrium Mound, yielded "modified tubular pipes of stone." This mound, recently excavated by Mr. Ralph Solecki, Smithsonian Institution, is Adena in type (personal communication with Solecki, February, 1949).

would, I think, have been reflected in more satisfying results in the pottery stratification.

Pottery classification and tabulation were handled by Marion Dunlevy. Her results show an upward seriation of sand-tempered, limestone-tempered, and shell-tempered types in that order. Only Archaic 3, Pottery 2, and Pottery 3 periods of the general Tennessee River sequence were represented at the Flint River site, and most of the pottery came from Pottery 2 period deposits. The earlier sand-tempered and slightly later limestone-tempered sequence within the Pottery 2 period checks with what was previously known for the north Alabama area. It is regrettable that further sequential differentiation could not have been established in this deep refuse stratigraphy. It is precisely this Pottery 2 period of the larger sequence which needs refinement. As established, Pottery 2 spans the long interval between the close of the Archaic and the rise of the Middle Mississippian cultures. The ceramic types associated with the burial mound cultures, including Copena, must necessarily fit into this span. Although difficulties with churned deposits have undoubtedly obscured vertical distributions of types, there are still suggestive percentage relationships in the block and level tabulations as presented by Dunlevy. She did not mention these in her discussion, but several may be followed through by detailed checking. For instance, the type Wright Check Stamped has a definite clustering in the upper levels as opposed to the type Pickwick Complicated Stamped, which shows slight increases in the lower levels. This is seen best in Block 4, but is less apparent in the gross tabulations under "Site Summary."

GORDON R. WILLEY
Bureau of American Ethnology
Washington, D. C.

The Whitesburg Bridge Site, Ma'10. W. S. WEBB and DAVID L. DEJARNETTE. Alabama Museum of Natural History, Museum Paper, No. 24. University, Alabama, 1948. 44 pp., 14 figs.

This is a site report of another Tennessee River shell mound in northern Alabama. The site in question is a smaller midden than the Fint River site (see above) and is located about 6 miles in a northwesterly direction from it. Excavation, analysis, and interpretation follow the same pattern as set down in the Flint River report. Cultural refuse was excavated by controlled blocks in arbitrary vertical levels. Analysis and tabulation of the findings follow these proveniences. The Whitesburg Bridge midden was found to represent the Archaic 2 period (slightly), Archaic 3 (heavily), Pottery 1 (slightly), and Pottery 2 (heavily). Thus, despite a depth of only 6 feet or less, a greater range of periods was recorded at the site than at Flint River. The site is noteworthy for the very clear division in the Pottery 2 period percentages. Dunlevy, who also prepared the pottery analysis for this report, has demonstrated very neatly the priority of the sand-tempered types over the limestone-tempered series.

GORDON R. WILLEY
Bureau of American Ethnology
Washington, D. C.

Bibliography of Ohio Archaeology. RICHARD G. MORGAN and JAMES H. RODABAUGH. Columbus: The Ohio State Archaeological and Historical Society, 1947. 189 pp., 8vo. Paper covers.

A published bibliography in compact form is a valuable research tool for any archaeological province, and this is it for the state of Ohio. The book is paper-covered (blue), 15 cm. by 22.7 cm., 1.3 cm. thick, exactly the same width and length as *The Ohio State Archaeological and Historical Quarterly.* There are 1351 titles, arranged alphabetically by authors, and each one numbered in succession. This is the main section of the book. The first section is a ten-page discussion of the history of archaeological work in Ohio, with emphasis on individuals and institutions. There are a preface and an index. In the latter the materials are arranged by subject and by county, and page numbers in bold face under "Archaeology, Ohio" refer to the best general works on the subject. Sixteen such titles are listed.

In the Preface it is stated that all published material except items from newspapers, county histories, and atlases, form the subject matter of the bibliography. Mills' *Archeological Atlas of Ohio* is included of course. The ancient diphthong difficulty enters in here, for in the bibliography the Greek "a" is present, whereas it is omitted on the title page of Mills' Atlas. This may have been the fault of the printer, and it serves to emphasize the exhaustive proof reading that was necessary. I have seen no typographical errors, and apparently the only mistake in information is under number 362, where the name of John W. Griffin should be substituted for that of James B. Griffin. There is one item that should have been included, a reference to Folsom points in Ohio, in E. B. Howard's *Evidence of Early Man in North America*, pages 120–21.

Stephen D. Peet comes out as the largest contributor to the subject, with an even 100 titles. Moorehead is next with 63. Ninety-one of Peet's articles were in the *American Antiquarian and Oriental Journal*, which is listed in this Bibliography as the *American Antiquarian*. The longer title was adopted after the second number of the second volume. Peet was for many years editor of that periodical. His writings on Ohio archaeology run from 1876 to 1909, and they are chiefly general and interpretive rather than descriptive of original excavation or research. The names of Mills and Shetrone, associated most distinctly with Ohio archaeology of any in recent times, have 39 and 17 titles respectively. The two largest works which deal primarily with Ohio are Griffin's *The Fort Ancient Aspect* and Gerard Fowke's *Archaeological History of Ohio.*

There are not many archaeological bibliographies, and this is the best that has appeared in the American field. One excellent feature is the inclusion of brief indications of the nature of most of the publications listed. The book is that much more than a mere bibliography and the authors can rest assured that those who use their work will be especially grateful on that account.

E. F. GREENMAN
Museum of Anthropology
University of Michigan
Ann Arbor, Michigan

Archaeological Researches in the Highlands of Bolivia. STIG RYDEN. With two appendices, by BENGT KJERRMAN and CARL HERMAN JHORTSJO and JOHANNES LINDH. Göteborg, 1947. 559 pages, 75 maps and plans, 245 line cut illustrations and 2 color plates. Kroner 50.

Dr. Ryden's latest major contribution in the field of South American archaeology is a report on field work conducted in 1938 and 1939, in the Bolivian *altiplano*, at a number of sites dating from Tiahuanaco to early post-Conquest times.

Field work in the form of test pits, and the clearing of house foundations and of several types of graves, was done in three districts in the southern Titicaca Basin. Seven pits were dug at Tiahuanaco. In the Jesus de Machaca district, south of Tiahuanaco and just east of the Desaguadero River, more extensive work was done at the hitherto little known Wancani (Huancane) site and at three village sites of late post-Tiahuanaco date. On the island of Taquiri and on the tip of the Copacabana Peninsula a number of subterranean tombs were excavated.

These investigations are described in detail, with numerous photographs, plans, sections, and with drawings of hundreds of sherds. In some cases practically all decorated sherds have been illustrated.

The results of work at Tiahuanaco add relatively little to our knowledge of that site, in spite of the addition of a few pottery shapes to the range outlined by Bennett. Most of Ryden's material is of Decadent Tiahuanaco style, although some Classic, and a little Early, confirm Bennett's over-all sequence. At Wancani the three stone enclosures, large monolithic statues, and pottery, place the site on the Tiahuanaco horizon. Classic Tiahuanaco pottery was found in the bottom of one pit, but the bulk of material is of Decadent style, which is followed by what Ryden calls Post-Decadent Tiahuanaco. This simple ware is "brown" (Ryden seldom uses the term "red" even for Tiahuanaco wares) with black designs. It is similar, if not identical, to that which Mrs. Tschopik,[1] Rowe, and this reviewer have called Collao Black on Red in the northern Titicaca Basin. The same post-Tiahuanaco style was isolated in house foundations at Pucara de Kohnkho and occurs frequently, on the surface, in the Jesus de Machaca district.

Two other village sites in the same area are placed in the late pre-Columbian and early post-Conquest periods respectively, on the basis of finds of Inca pottery in both, and of European artifacts and animals in one. Some of the pottery is recognizable as the Cuzco Inca style. Other sherds appear similar to those of the type Mrs. Tschopik calls Chucuito Black on Red, and perhaps also to her Chucuito Polychrome.[2] Ryden believes the Inca villages represent "*mitimaes*" from the Cuzco district, although the possibility of a "strongly Incaized" Colla culture is not entirely dismissed. It is, perhaps, more probable, as a result of Mrs. Tschopik's finds, of which Ryden was not aware, that the latter interpretation is the better one. In such a view, of course, there is the implicit assumption that the Chucuito and Chucuito-like wares were made by native Titicaca Basin Indians, under rather strong Inca influence. This is also reflected in the presence of pottery imported from the Cuzco district and/or local copies of the Cuzco style. The assumption is indicated, but far from proven, by Mrs. Tschopik's work. Whatever final judgments on this point may be, Ryden's village site excavation is the first of its kind in the entire area. His sequence of pottery types, from Post-Decadent Tiahuanaco to Colonial, agrees generally with those tentatively determined on the Peruvian side of Lake Titicaca; the added data will be most useful to future workers.

Chullpa and subterranean grave excavation in the Tiquina district produced less conclusive results, chiefly by reason of a relative scarcity of pottery and lack of available comparative material. The graves appear to Ryden to be of post-Tiahuanaco age, with some Inca influence occasionally present. None contained Cuzco Inca wares, and, therefore, cannot be ascribed to Inca colonists. Chullpa distributions are also discussed in this section.

In addition to site reporting there is a section describing textiles collected by Metraux from several chullpas in the Carangas district. These fabrics are probably of post-Columbian date.

Two appendices present analyses of some of the bronze objects found in excavating the Inca village sites, and of the small series of skulls from the graves.

Much of the text of this work is devoted to description of individual sherds, which, in view of the extensive illustrations, might have been grouped and presented in somewhat more compact form. Description by categories and tabular presentation are at a minimum. The data, however, are unusually complete and the book will be invaluable to anyone concerned with Andean archaeology.

ALFRED KIDDER, II
Harvard University
Cambridge, Massachusetts

Island of Death (Easter Island). WERNER WOLFF. New York: J. J. Augustin, 1948. 228 pp., 20 pl., 83 fig. $7.00.

Advance publicity for this book has already so echoed in reviews for the general public that the anthropological profession cannot conveniently pass it by unnoticed. Its handsome binding, ample illustration, and attractive typography help to aim it at the interested lay reader as well as at the professional. For the former it promises to clear away the "mystery" of Easter Island which so intrigues the public at large; and to the specialist, who is well aware of the gaps left unbridged by the painstaking ethnographic field work of Metraux and his predecessors, it promises fresh data from ten years of psychological analysis of the archaeological and ethnographic remnants of the broken culture of the islanders. Unhappily, the work fails to fulfill either promise. Whatever one's trust in the potential contribution of psychology to this sort of anthropological problem, this more than bold attempt at psychological introspection impresses one as compounding rather than clarifying the overworked "mystery" of Easter Island.

The author briefly sketches the geographic and environ-

[1] Marion H. Tschopik, "Some Notes on the Archaeology of the Department of Puno, Peru," *Papers of the Peabody Museum of American Archaeology and Ethnology*, Vol. 27, No. 3, Cambridge, 1946, p. 21.

[2] *Ibid.*, pp. 27–31.

mental setting, the history, and salient features of the culture, before settling on the items he regards as crucial to the problems of the origins of the natives and their "total mental patterns." These items are: the bird cult, which involved an annual feast and rites that loomed large in island life; the great stone statues which stand on the island slopes or on stone platforms at the edge of the sea-cliffs; and the quasi-script of symbols carved on wooden billets which were used as guides to chants. The author compares the carved symbols with Egyptian glyphs (Chapter V), reconstructs several chants (Chapter III), discusses cultural origins (Chapter IV), the islanders' modes of thought, and the relationship of the *mana* concept to all of these features or to concepts derived from them (Chapters VII, VIII). At times, as when he shows that graphic representations of natural objects (man, trees, fish, the moon, etc.) from Easter Island resemble those of Egypt (pp. 130 ff.), one wonders whether his purpose is to demonstrate modes of thought common to all humanity, but this he specifically denies (pp. 129–30). His purpose is to elucidate the origins and symbolic basis of Easter Island culture alone.

Mr. Wolff does not believe native tales of magic, but seriously entertains the hypothesis that the statues were moved to their shoreline positions by being blown out of their quarry in the volcanic crater: " . . . the thesis of volcanic transportation would simplify and explain the extraordinary feat of fifty-ton objects rising, without mechanical aid, and being placed on roadless cliffs . . . . And so the statue as the 'flying red bird' may not have been entirely legendary, but actually a mass of glowing red—like the horizon sun and the red bird winging across the sky—thus evoking the bird-man symbol" (p. 161). He does not suggest in addition how the heavy red stone caps, hewn from a separate quarry six miles away, happened to land atop the several statues which wore them. The foundation of his cryptographic efforts is the glossary of quasi-script symbols taken from Metoro Touara, an emigrant to Tahiti in the late nineteenth century, in which he justifies his confidence with: "Since parts of his glyph lexicon, showing distinctive objects, are obvious (i.e., a glyph called a star graphically shows a star), Metoro's account seems generally reliable" (p. 65). Even without help from Smith and Perry, whose works do not appear in his bibliography, he accepts without criticism claims of cultural connections ranging from the Maya to the Norse, which, because "there are too many such relationships to call them merely coincidental" (p. 124), lead to the conclusion that "Easter Island could very well have been a crossroads for navigators. And so, there might have been a time when the island was truly *Pito te Henua:* 'the navel of the earth' " (p. 126).

These points, made without fresh evidence, or even first-hand observations, are merely alternative interpretations contradicting better substantiated conclusions and hypotheses advanced by Metraux and others. The author's special field, however, is symbolism, and the crux of his efforts is the development of an "interpretative key," or web of symbolic concepts linked together by various imaginative devices. Here, one's search for interpretations which are relevant and useful, as well as novel, is hampered by an excess of gratuitous assumptions, contradictions and errors in fact, nonsensical phrases, and, above all, departures from the elementary canons of logic. The reader may remain unconvinced for example that statues, chiefs, and death can validly be linked in symbolism by the tour de force of a simultaneous double etymology for a single word (p. 45: *maea-matariki*, stone for statues <*mata+ariki*, figures of chiefs, and <*matara+iki*, untie the victim). Because a Tahitan chant refers to cockcrow at sunrise, it does not follow that "the bird" (any bird) is related to sun symbols on Easter Island; nor does vague reference to "the bird" as a symbol of life (p. 47) and again as a symbol of death (p. 33) in "the old Orient" prove either the existence or the historical connection of a polar symbolism of death and new life or rebirth for birds on Easter Island.

Anthropologists may find some use for the additions to Metraux' bibliography of Easter Island literature, but one suspects that even the lay reader may close the book feeling that "the spirit of madness which hangs over the culture of Easter Island" (p. 176) is in some measure the product of the author's imagination.

R. K. Beardsley
Department of Anthropology
University of Michigan
Ann Arbor, Michigan

NOTES AND NEWS

ARCTIC

Dr. Henry B. Collins, Jr. spent the summer excavating an Eskimo site near Crystal II, the Air Force Base at Frobisher Bay, Baffin Island. This work was undertaken at the request of the National Museum of Canada and was a joint project of that organization and the Smithsonian Institution. He also made anthropometric observations on 80 adult Eskimos.

The most recent material at this site antedated the voyage to Baffin Island by Martin Frobisher in the sixteenth century, for he found the natives already using iron and no trace of this metal was found in the site. The site was a small village of semi-subterranean houses, with walls of stone and whale bone and roofs of whale bone, erected in excavations 2 to 3 feet deep, entered by tunnels. These houses and most of the artifacts were Thule, evidently from an early phase, for there were none of the special eastern types found at Mathiassen's Thule sites. In fact, the material was remarkably like that of the Alaskan Thule-Punuk as found at Wales and on St. Lawrence Island. The site had evidently been previously occupied by Dorset people, for their artifacts (including 20 harpoon heads) were found in midden areas adjoining the houses, and for the most part occurred at levels below those with Thule objects. A single Dorset harpoon head was found inside a house, but this was from below the stones supporting the sleeping platform. The collections contained an unusually large number of chipped stone blades of many types, mostly Dorset forms, whereas ground slate blades were very scarce.

The Peabody Museum Aleutian Expedition of Harvard University spent three months in the Aleutian and Pribilof Islands conducting an integrated anthropological program, consisting of six principal fields of study: physical anthropology, medicine, dentistry, linguistics, archaeology, and ethnology. The expedition was supported by funds from the Viking Fund, Inc. of New York and by the Human Ecology Branch of the Medical Sciences Division of the Office of Naval Research. Transportation was provided by the U. S. Navy, Coast Guard, and Army.

Personnel of the expedition consisted of seven men. Mr. William S. Laughlin, Field Director, performed the blood typing and anthropometry, made ethnological studies, and supervised the archaeology. Dr. Coenraad F. A. Moorrees, Research Fellow in Orthodontics at the Forsyth Dental Infirmary, Boston, conducted all dental examinations and treatment, etc. Dr. Fred Alexander, Research Fellow in Cardiology at the Massachusetts General Hospital, performed all medical examinations and made a special study of heart conditions. Dr. Stanley M. Garn, Research Fellow at the Massachusetts General Hospital and the Forsyth Dental Infirmary, conducted morphological examinations on the living Aleut. Mr. Gordon Marsh, Instructor in the Department of Foreign Languages, University of Nevada, made linguistic studies of the Umnak, Atka, and Attu dialects. Mr. Alan G. May, of Wenatchee, Washington, served as archaeologist. Mr. Charles I. Shade, anthropology student at Harvard, was assistant archaeologist.

It is impossible to summarize all the findings in these various fields. Each member of the expedition is preparing reports which will be published in appropriate scientific journals. These are to be abstracted and assembled into a Peabody Museum publication which will give an integrated and comprehensive picture of the Aleut today and of their ancestors.

Archaeological collections were obtained from various sites: a cave and village site on Amilia Island, previously visited by May and Laughlin on the late Dr. Hrdlička's expedition in 1938; a collection of matting from a mummy cave on Kagamil; a mummy and matting from a cave on Carlisle Island, between Adak and Umnak Islands. The most important archaeological work was done at the old village site of Nikolski on Umnak Island, where Mr. Walter Aarron of the University of Alaska and Mr. Robert Dorsett of the University of Michigan assisted in the excavations. This site had previously been explored by May and Laughlin with Hrdlička in 1938. It is deep, well stratified, and rich in artifacts. Here, this past summer, May and Shade succeeded in documenting a stratigraphic column over 20 feet in depth, near the midline of the site. Analysis of the material, shows that there are some differences between the lower "pre-Aleut" and the upper "Aleut" strata, particularly in harpoon types, the labrets of the later periods, and in ivory carvings. Mr. Fred Johnson, who has examined the material, calls attention to evidence of a "shearing technique," employed in the chipped stone work of the bottom layers. He has found the same technique in early sites in Yukon Territory (see below). The archaeological evidence appears at present to bear out the thesis that the Aleuts were relatively late comers to the Aleutian Islands.

The cephalic indices of the 54 present inhabitants of Nikolski range from 80 to 90, whereas the highest index for the pre-Aleut skeletal population was only 76.50. Dr. Hooton and Mr. Ivar Skarland of the University of Alaska have made a preliminary analysis of the pre-Aleut skulls and confirm Hrdlička's assertion that the pre-Aleut constituted a morphological type distinct from the present Aleut and also from the Eskimo. In blood type the living Aleut were found to be 47.7% O, 45.5% A, 4.5% B, and 2.3% AB; 67.5% M, 29.4% MN, and 3.2% N; all were Rh positive. In these blood group frequencies they are strikingly similar to some Eskimo groups.

During the past summer the National Museum of Denmark and the University of Alaska collaborated in archaeological work in the Norton Sound-Bristol Bay area of Alaska. A party consisting of Drs. Helge Larsen and Erik Holtved, National Museum of Denmark, and Mr. Owen E. Rye, University of Alaska, made an archaeological survey of the coast between Bristol and Kuskokwim Bays. Six days were spent at the site of Pawik, previously investigated by

Hrdlička, but nothing was found antedating white contact. Eleven days were spent working on a site just north of Dillingham and in an aerial reconnaissance of the coast between Dillingham and Goodnews Bay, where 17 previously unknown sites were found. Later, five sites were investigated between Goodnews Bay and Cape Pierce. The two largest were near the points of the sand spits forming the entrance to Goodnews Bay. The house ruins, about 150 on the south spit and 70 on the north spits, seem to be contemporary and not very old. The culture, which is probably late protohistoric, is characterized by the use of slate implements and ordinary coarse Eskimo pottery. The modern village of Platinum on Goodnews Bay is built on top of a much earlier site, of which only two undisturbed houses were found. One of these, which had burned down, contained over 400 specimens, mostly finely chipped stone implements of Ipiutak type and basketry, but no pottery at all. A site at Chagvan Bay, south of Goodnews Bay, consists of about 50 houses of all ages. The earliest contained evidences of a culture similar to that found at Platinum, but with coarser chipped stone tools and with pottery. This pottery was much finer than the ordinary Eskimo pottery and some pieces had check-stamped decoration. A site of about 30 houses at Nanvak Bay just north of Cape Pierce was in many respects similar to the Chagvan Bay site. In addition to the archaeological work, Dr. Holtved made wire recordings of songs and stories at Dillingham, Wainwright, Kuskokwim, and Yukon.

The Andover-Harvard Yukon Expedition under Frederick Johnson and Hugh M. Raup spent about fourteen weeks in southwestern Yukon Territory this past summer, continuing the type of investigation begun in 1944 (AMERICAN ANTIQUITY, Vol. 11, pp. 183–6, 1946). The work was concentrated in the Shakwak Valley, principally along the Alaska Highway between Champagne and the northwestern end of Kluane Lake, and in addition a reconnaissance was made into the mountains north of Kluane Lake, to a valley known as Ptarmigan Heart at the head of one of the tributaries of Nisling River.

Evidence for early human occupation is now derived from about twenty ancient camp sites located at various levels from the bottom to near the top of a layer of windblown soil (the "Kluane silt") which blanketed the valley. Above these ancient sites, and separated from them by a thin layer of volcanic ash which has been dated at about 500 A.D., are more recent prehistoric sites of similar nature, also in wind deposited silt. On the present surface are numerous Indian camp sites dating from the time of contact with Europeans or perhaps slightly earlier.

The sites are marked by stone artifacts and hearths. The most common tools are thin flakes, the edges of which have been retouched by "shearing." Snub-nosed scrapers are also common. About a dozen stone arrowheads were found. Heavy tools, such as chipped knives, are rare. Fragments of small prismatic blades are widespread, but not common. Surprisingly enough, although cores from which such blades were struck had been found in 1944, none were found in 1948. At present the distribution of this industry is not well understood.

Although the study of the botanical and geological data is not yet completed, it would appear that most of the country during the period of the deposition of the Kluane silt was covered by grassy tundra or prairie, not by forest. Trees do not seem to have come into the Shakwak Valley, except along water courses, until after the volcanic ash fall of 500 A.D. It is to be expected, therefore, that the ancient human occupants had access to grazing animals in their hunting. The most ancient traces of human occupation occur at the base of the wind blown soils, and these lie immediately on top of the great outwash terraces and lake deposits which were formed at the time of the disappearance of glacial ice from the valley floor. Thus the culture-bearing silts cover all of post-glacial time, including the post-glacial climatic optimum, believed to be between 3000 and 7000 years ago.

Dr. Douglas Leechman of the National Museum of Canada made an archaeological survey in western Canada this past summer. He visited a number of amateur archaeologists from Winnipeg to Edmonton, inspecting their collections and accompanying them into the field to check on their methods of excavation, etc. In southern Yukon Territory he found a number of sites of the same early culture as that investigated by Frederick Johnson and Hugh Raup, and he believes that it can be traced south for a considerable distance through British Columbia, a hypothesis which he hopes to test in the near future.

Dr. Louis Giddings, Jr., of the University of Alaska, this last summer excavated at two important sites on Cape Denbigh, the basaltic ridge which separates Norton Bay from Norton Sound. The first of these large sites, Nukleet, is a mound on a steep slope above a 70-foot cliff, and contains stratified and permanently frozen deposits some 7 feet thick. The material from the uppermost levels dates from about 1600 A.D.; below is represented a range equivalent to that of the Kobuk River sites previously excavated by Giddings (AMERICAN ANTIQUITY, Vol. 10, No. 2, pp. 113–34, 1944; Vol. 13, No. 3, p. 267, 1948). The lowest strata yielded remains closely akin to the Early Punuk of St. Lawrence Island, with a scattering of ivory specimens suggestive of Old Bering Sea. Matting and fragments of skin clothing, etc., were preserved in the frozen soil. The upper levels are closer in cultural content to other mainland sites than to St. Lawrence, but running through all levels are inland traits, such as beaver-tooth whittling, that give the site a character all its own.

The second site, Iyatayet, at the mouth of a stream, also contains 3 or 4 feet of frozen midden, mainly corresponding to Early Punuk. Below the sod line under this midden, are partly thawed clays, lacking organic materials. Where these clays are stratified, the upper foot or so contains many Ipiutak stone types, but also Dorset-like arrowpoints, knife blades, etc., and pottery unlike any reported in the area before last summer. (It seems to be similar to that found by Larsen at Chagvan Bay, farther south.) This pottery is very thin (about 45 mm. thick) and hard, and is completely covered outside with minute check-stamping or vertical striations. Below these pottery-containing layers, and below the underlying layer of sterile sandy clay, is a thin gravelly stratum containing mainly lamellar flakes and their derivatives. Many of the flakes are carefully, even almost

microscopically retouched. Some end blades and side blades are diagonally retouched on both faces; other blades or side scrapers are retouched only on the convex surface. This layer yielded no pottery, but did contain very small stone lamps.

Abundant tree-ring material was collected from the frozen middens of both sites. Wendell Oswalt and Walter Arron also obtained datable wood from Kukulik on St. Lawrence Island, which is expected to extend the tree-ring calendar. (*F. de L.*)

PACIFIC COAST

The University of California at Santa Barbara conducted an archaeological survey of the proposed new campus site at Goleta in January. Work was in charge of Dr. Norman E. Gabel who was assisted by F. Fenenga and F. Riddell of the California Archaeological Survey. Plans have been made to salvage the remaining sites on the campus grounds. As preparations proceed for the construction of the new buildings, the newly initiated Anthropology Department at Santa Barbara hopes to acquire a small but adequate anthropological laboratory.

Douglas Osborne, acting Field Director of River Basin Surveys, Pacific Coast Area, reports that R.B.S. activities have consisted of completion of all cataloguing and storage of the materials recovered by survey parties in the summer of 1948. Laboratory assistants L. Collins and H. Zakoji have carried out this work, and in addition have cleaned and catalogued the 50 skeletons taken from Site 45-BN-3 near Umatilla, Oregon. This skeletal material has been shipped to the U. S. National Museum for study. Artifacts from 45-BN-3 have been catalogued, and are now in the process of being studied for the final report on the site. Osborne has brought up to date all of the office and survey files, and has written up all the survey reports resulting from last summer's work. Planning is completed for excavation of two sites in the McNary Reservoir during the summer of 1949.

Phil C. Orr of the Santa Barbara Museum of Natural History reports further progress on the Channel Island archaeological survey during February and March with the cooperation of J. F. Sefton, Jr., president of the Sefton Foundation of San Diego. Orr joined the second, third, and fourth Sefton Expeditions on the ship *Orca*, which visited the islands of Santa Catalina, Santa Barbara, San Nicolas, Los Coronados, and Todas Santos. Particular attention was paid to the steatite quarries on Santa Catalina, and numerous specimens of steatite were collected. Orr hopes to make petrographic examinations of steatite artifacts and compare them with samples from known quarry sites. Santa Barbara Island proved barren of archaeological remains, and San Nicolas yielded numerous skeletons and fabrics from graves. Attention was paid on San Clemente Island to site survey. Los Coronados proved barren of sites, but Todas Santos proved to have been occupied, one site being still occupied by Mexican fisherman.

M. R. Harrington of the Southwest Museum has been appointed Associate on the staff of the Department of Anthropology of the University of California at Los Angeles. Harrington plans to return to the Little Lake area where he will excavate the Stahl site and another nearby deposit in the hope of gathering additional information on the Pinto culture. It is planned that June and July will be spent in the field, some of the assistance being by University students from Los Angeles.

Carroll Burroughs of the University of Washington will be in charge of the Beginner's Field School which will work on San Juan Island, Washington between June 20 and August 20. The site is a large shellmound. Point Roberts, Washington, will be the scene of a joint excavation carried out by the University of Washington and the University of British Columbia under the direction of C. Borden of the University of British Columbia. Several survey parties will be working during the summer in the Puget Sound area, and at least one excavation will be conducted.

The Department of Anthropology at Berkeley will have in the field research parties in the Santa Barbara region, northwestern California coast, and Sacramento Valley. The first two groups will do straight research on culture sequences and site contents; the last will be a 15-student summer session class learning the methods of site survey and excavation. To assist in teaching archaeological methods, a *Manual of Archaeological Field Methods* has been written. It is published by the National Press, Millbrae, California and sells for $2.00.

The California Archaeological Survey brings its first year of activity to a close with the publication of the third and fourth *Reports* (No. 3, "Methods of Recording and Present Status of Knowledge Concerning Petroglyphs in California"; No. 4, "A Bibliography of the Archaeology of California"). Numerous survey trips, minor excavation projects, and the compilation of a file of nearly 4,000 sites from old and new survey records were accomplished. Publications of the California Archaeological Survey may be secured at nominal cost from the University of California Press, Berkeley 4.

Some advanced graduate student research projects are worthy of mention. Clement Meighan is engaged in a long term program of analyzing the types and determining the dates of introduction of European glass trade beads into western North America. The first year's work has resulted in the determination of about 400 separate types, many of which can be dated and assigned to introduction by Spanish, English, Russian, or American traders. Meighan's data will be of considerable value as a reference source for identification and dating of glass beads in this area. Other current projects, which are mainly distributional analyses of special elements, include those by J. Bennyhoff on fish spears and harpoons in California; by A. Mohr and F. Riddell on chipped flint crescents; by W. King and H. Eberhardt on cog stones of southern California; by R. F. Heizer on curved bone and shell fishhooks; and by C. Smith on petroglyphs. These studies represent the necessary preliminaries to more inclusive analyses which will ultimately produce an over-all and integrated picture of California prehistory. Because far northern and southern California are least understood in regards to sequence of cultures and their constituents, the University is now shifting its main attention in field research toward these regions.

Work was continued by S. F. Cook and R. F. Heizer

under a Viking Fund grant on chemical analyses of human bones from archaeological sites. A paper is in press in the *University of California, Archaeological Records* on the results of the 1948 experiments, and these, together with the results of the 1949 work, continue to favor the probability that an absolute time scale based upon mineral content of bone will be achieved. The report by A. Treganza and C. Malamud on the 1947 excavations of the Topanga culture site is now in press, and the 1948 report by Treganza and A. Bierman is being readied for the printer. There appeared in April a long-deferred monograph on the Early Central California culture by R. Heizer. Four additional monographs on California and Mexican archaeology are now in press in the series *University of California Publications*.

The Southern California Archaeological Survey group reports, through its newly elected president, R. Ariss, that Dr. D. Luhrs of the University of Southern California is working most weekends with an excavating group in Sycamore Canyon. Survey members affiliated with the University of California at Los Angeles are active in the Simi Hills and Cady Mountain regions. Mr. G. Smith of the San Bernardino Historical Society, and Dr. Becker of the University of Redlands are conducting surveys and excavations in Yucaipa Valley. Miss R. Simpson of the Southwest Museum is surveying for sites in the Willow Springs district west of Mohave, and Mr. H. Edwards of the same institution hopes to carry out reconnaissance in the Randsburg district. Mr. D. Rice is connected with the River Basin Survey project at Whittier Narrows Dam. (*R.F.H.*)

THE 1948 SOUTHWESTERN CONFERENCE

Taking exception to the phraseology in one paragraph of the report of the 1948 Southwestern Archaeological Conference, Marie Wormington has prepared the following statement, which more accurately reflects the action taken at the Conference.

"During the afternoon meeting of August 25 the Southwestern Archaeological Conference, under the chairmanship of Theodore D. McCown, dealt with pre-pottery and non-pottery cultures. Projectile point terminology was discussed. H. M. Wormington pointed out that much confusion has arisen from the lumping together, under the term "Yuma," of many typologically dissimilar forms which are quite possibly unrelated. It was further indicated that this term had always been an unfortunate choice because of its cultural and linguistic connotations.

"Following the discussion, a resolution was proposed by Dr. Emil W. Haury that the term "Yuma" be abandoned and that a binomial system be adopted for the designation of projectile points. Herbert Taylor suggested that the two aspects of the resolution be considered separately. Dr. Haury rephrased his resolution and the first proposal was that the term "Yuma" no longer be applied to projectile points. This was unanimously approved. Next, he presented a resolution that a binomial system be used in naming projectile points. Some discussion followed. It was pointed out that in the case of fluted points a binomial system, using a type station name and a descriptive term, as, for example, Folsom Fluted and Clovis Fluted, was already in use. There was a brief consideration of terms which might be used, in conjunction with type station names in designating points which had been called Yumas. The acceptance of the first resolution automatically eliminated such terms as Eden Yuma, etc. No specific conclusions were reached as to the terms which might be substituted. The resolution that a binomial system be adopted was then proposed and was unanimously approved."

MIDDLE AMERICA

The following news of the Carnegie Institution's fieldwork during the 1948–49 season is supplied by Dr. A. V. Kidder: "A. L. Smith continued a survey of the Guatemala Highlands begun in 1946. At Nebaj, in the Department of El Quiché, he found that erosion of the sides of a trench, opened by him in 1947 in a large mound in the site near the town, had exposed a Late Classic tomb, the second of that period and the ninth to be encountered in that mound. As these tombs range from Early Classic, through Late Classic, and well into post-Classic (Metal and San Juan plumbate) times, they have yielded valuable data on the development of mortuary customs, ceramics, and jade carving. Mr. Smith located, mapped, and collected pottery samples from other sites in the Nebaj and Sacapulas areas. He then spent several weeks in the hitherto little known San Andres Sacabajá region, where a number of large post-classic ruins were studied. At the time of this writing he and R. E. Smith are extending the survey to Alta Verapaz.

"Karl Ruppert and G. W. Brainerd, the services of the latter kindly made available by the Southwest Museum and the University of California at Los Angeles, have been since early winter engaged in a survey of southern Yucatan and northern Campeche. The aim of this work is to acquire pottery samples, which it is hoped will serve to determine the cultural and chronological relations of the many important but hitherto undated ruins of the Chenes and Río Bec areas to those of northern Yucatan on the one hand and the Peten on the other. Messrs Ruppert and Brainerd are still in the field.

"At Kaminaljuyu, in the outskirts of Guatemala City, E. M. Shook has continued his work in the great Miraflores Phase mound in which, in the winter of 1948, there was discovered a tomb which held over 300 pottery vessels, stone vessels, and jades. During the present season a second, somewhat later, tomb was encountered. It was of the same shape—that of an inverted stepped pyramid. The offerings were less abundant than those of the other, and in ancient times it had been entered and the skeleton of the principal occupant had been robbed of whatever ornaments may have been at the head and chest. Overlooked, however, was a remarkable mask, or perhaps headdress, apparently of wood, which had been set with large, carefully fitted jades. The elaborate construction of these tombs, the richness of their contents, and the great size of the mound in which they have been placed, argue for a social organization more advanced and an economy more stable than had previously been supposed to have existed prior to the full Classic period."

With the aid of a Viking Fund grant, Edwin N. Ferdon, Jr. of the School of American Research made a trip from December through February to the ruin of Tonalá, on the

Pacific coast of Chiapas, Mexico for the purpose of completing an archaeological survey of this site started by the School in 1937. He was assisted in the field by José Luís Lorenzo, of the Museo Nacional de México.

Twenty-one masonry platforms were completely cleared of trees and bush. Eighteen of these were found to be in sufficient repair to warrant making large scale ground plans, and front and cross section drawings of them. Temple platforms were found to be comparatively low structures with battered facings, constructed of large granite blocks, and topped by plain, battered, apron mouldings. Stairways lack balustrades and many are set a foot or two into the upper surface of the basic platform. The few low walls that could still be found showed most temple structures to be simple, rectangular rooms with either one or three doorways. In the latter case the doorways are separated by rectangular masonry columns. Mud seems to have been the only binding material used in construction, as no sign of lime mortar or plaster was found. Besides the stone sculpture already reported for this ruin, a La Venta (Olmec) style jaguar head was found. It is formed by grooved lines on the side of a large granite boulder. A few previously unreported plain, discoidal altars and plain, rectangular or roughly columnar stela were also disclosed.

The Peabody Museum, Harvard University continued field work in Costa Rica in 1949 under the direction of Dr. and Mrs. S. K. Lothrop. Owing to unsettled political conditions in the north, it was not possible to renew the excavations started in 1948. Hence a study of the southern Pacific plains on lands of the United Fruit Co. was undertaken instead. After locating a series of classical Chiriquí cemeteries covering some 1,500 hectares in the Coto valley, headquarters were moved to Palmar Sur for the rest of the season. This town stands on the banks of the Río Diquis (Río Grande de Térraba), whence great banana farms extend to the Río Sierpe. Heavily forested plains and swamps continue far to the south.

The outstanding archaeological feature is the presence of granite balls ranging from a few inches up to 8 feet in diameter, which were first described by Mrs. Doris Z. Stone.[1] Measurements were taken on many of these to check their rotundity. On a well-made pair, ten circumferences at various angles differed by less than an inch in 20 feet.

Excavations, consisting of many test pits, were undertaken at seventeen sites. These usually were marked by low mounds of sterile earth with retaining walls of oval river boulders laid crosswise in adobe. Refuse lay outside these walls, rarely more than a couple of feet thick, and was also found on the flat where cut by ditches.

The pottery, when studied, is expected to reveal two or possibly three periods. The most recent group, with which the stone balls are linked, consists of very small tripod bowls painted in red and black like the Chiriquí alligator ware, also huge jars and bowls set on tripod legs as much as 15 inches high. Eight trade wares encountered with these came from Nicoya, Chiriquí, and Coclé. This serves for cross dating over a large area.

An early pottery group was sometimes found near the surface in open sites but also was discovered directly under the first group, sometimes separated from it by a broad sterile band. It consisted of a bright red ware and an incised brown ware. Shapes are reminiscent of the Amazon Valley.

There is evidence that an intermediate pottery period will emerge as the result of further study, consisting of figurines and ceramic styles perhaps ancestral to both classical Chiriquí and classical Coclé.

A large collection of stone statues also was made. Some of the types have been published by Dr. J. A. Mason.[2] These either were found on house platforms in the jungle by hunters or were discovered in great caches in refuse, broken apparently by fire.[3]

A mid-season report received from Richard S. MacNeish shows that he has had great success in his present survey and excavation activities in the State of Tamaulipas Mexico. He began work early in December, 1948 and is about now (May 1, 1949) supposedly winding up the season. His report is too long to be reproduced in full so I will abstract it by using a combination of both his and my own words.

By mid-season excavations had been made at twelve sites and involve problems of ceramic stratigraphy and of non-ceramic "Early Man."

The first few excavations north of Panuco, Vera Cruz, were in sites with Ekholm's Period I pottery on the surface. They contained no earlier material but add considerable information on the content of this early period as well as confirming the Period I–II sequence. Another excavation on the bank of the Panuco River was, however, more spectacularly successful. This was a stratigraphic trench going to a depth of 26 feet and supplying roughly 50,000 sherds. Strata of only Period I sherds began at a depth of 3.5 feet and refuse continued to a depth of 23 feet. Superficial examination shows at least two and perhaps three radical ceramic changes beneath the so-called Huasteca Period I. There are notable changes in the form and decoration of *molcajetes* and in figurines. Chila White pottery diminishes in the lower levels, while in the middle levels there is a black ware often decorated with incised lines filled with red or white paint. In the lower levels a heavy red ware is dominant. It is stated that the Chila White sherds or variants of them found in the lowest levels are not primitive, although the other types are. These few details on this excavation have exciting implications in regard to the possible identification of the earlier ceramic cultures of Mesoamerica.

A shallow site at Llera, Tamaulipas was also dug and proved to be solely of the previously defined Pueblito I culture. Evidence was obtained to indicate that this cul-

[1] Doris Z. Stone, "A Preliminary Investigation of the Flood Plains of the Río Grande de Terraba, Costa Rica," AMERICAN ANTIQUITY, Vol. 9, No. 1, 1943.

[2] J. A. Mason. "Costa Rican Stonework," *Anthropological Papers of the American Museum of Natural History*, Vol. 39, Pt. 3, New York, 1945, Pls. 52–60.

[3] For work further south, in Panama, see below, p. 80. *Editor.*

ture correlates in time with Ekholm's Period II instead of his Period III as was previously supposed.

The remainder of the work was in a series of caves along the Canyon Diablo in the Sierra de Tamaulipas. The first cave contained from top to bottom a thin layer of relatively recent material, a 1-to-4 foot dark layer containing in the upper portions a figurine and sherds of the Pueblito I–II phases and in the lower, and along the junction with the sands below, a complex of small wide round-based projectile points, humpbacked scrapers, grinders, hammerstones, and a few large oval knives (Nogales Focus). This stratum of water-laid materials is about 70 feet above the present bed of Canyon Diablo and may be correlated with the highest of the two river deposits that flank the canyon. As yet no geological work has been done but the indications are that this would correspond to a pluvial period. In and under part of these river deposits were dark layers of refuse containing burned rock, charcoal, flint chips, large snub-nosed scrapers, hump-backed scrapers, hammer and anvil stones, and large crude ovoid knives (Diablo Focus).

The second cave confirmed in part the stratigraphy outlined above, but did not include the Diablo Focus. However, two flexed burials of the Nogales Focus were found.

The third cave was 600 feet above the floor of the canyon and very dry. On top was Pueblito I material, with pottery, and below is a layer of vegetable matter with no pottery but containing corn, cotton cloth, basketry, a dart shaft, seeds, etc., as well as various stone implements. This is called the La Perra Focus, but is similar to the Nogales and Abosolo foci. Below this and separated from it by a sterile layer was an horizon of stone implements seemingly of the Diablo Focus. The particular importance of this cave lies in its revealing an apparently agricultural but preceramic phase.

Another Early Man site was also discovered where the Arroyo Chorreras crosses the Ciudad Victoria—Brownsville highway. Here a hearth-like bed of charcoal includes and overlies the bones of mammoth.

During the later months of the field season excavations were planned along the Tamaulipas coast under the direction of Mr. James C. Garner of the University of Texas and also at a Repelo-Abosolo site having both Huasteca sherds and Big Bend projectile sites on its surface. (*G.F.E.*)

SOUTH AMERICA

Brazil. Mr. Clifford Evans, Jr., and Mrs. Evans (Betty Meggers) have recently communicated concerning their archaeological survey in the vicinity of Marajo Island. The Evans have been in Brazil since July, 1948.

Evans states that they have thoroughly surveyed the north coast of the big island of Marajo from the Rio Croari to Ig. Jacare. They have also covered the ground on the two smaller islands, Mexiana and Caviana. To date they have excavated 13 sites on the north coast of Marajo. All were habitation sites, and burials were found in the refuse trash and not in urns. Sites varied in depth, but the best were only 1.00 to 1.50 meters deep. All had been built up on natural rises, as these were the most likely camp spots. They are not artificial mounds but debris heaps. The pottery from these sites is predominantly crude plain or crude incised ware. Only a few sherds of the well-known Marajo painted styles were found in these sites, and all of them came from the upper levels of the sites.

On Mexiana the Evans found one large occupation midden in which Marajo champlevé ware was well represented and was associated with a true corrugated ware. Other Mexiana sites were all different and represented complexes heretofore unknown. A little Portuguese contact material was found in some sites.

On Caviana 13 sites were excavated. The majority of these sites showed affiliations to some of the Mexiana sites in the presence of a crude plain ware, some modeling, huge burial urns, stone axes, and jadeite pendants. One cemetery site on the island did have connections with South Marajo.

At present Evans feels that North Marajo and the islands form one area-culture unit as opposed to South Marajo. The latter seems to be the center for the classic Marajo style known from the museum collections. It is the Evans' present intention to spend some time in Belem studying and classifying their material, and then, if time permits, to make a brief survey of the South Marajo area.

Colombia. During a recent visit to the United States, Sr. Luis Duque Gomez briefly outlined the archaeological program of the Colombian Servicio de Arqueología of which he is director.

In the Sierra de Santa Marta, well known from the earlier work of J. A. Mason, two Colombian anthropologists, Sr. Gerardo Reichel-Dolmatoff and Sr. Eduardo Caicedo, have recently uncovered or mapped the foundations of some 3,000 house rings or dwellings. It is anticipated that some of these sites will be excavated in detail. To date, no evidence of cultural stratigraphy has been forthcoming.

On the Sabanna de Bogota, two other members of the Servicio, Srs. Julio Cesar Cubillos and Joaquin Parra, have worked in two sites of the Chibcha culture. At Ubate mummified remains, painted mantas, and emeralds were recovered from dry graves. At Sibate some 50 tombs were opened.

In the very little known region of Turbo, on the Gulf of Uraba, Sr. Arcila Velaz has just completed a survey of archaeological sites.

At the well-known site and national monument of San Agustín in southern Colombia a number of tombs have been opened within the past year. Duque points to the significance of the fact that the style of goldwork in the tombs is quite comparable to that from other areas and cultures which have always been considered late. This places the generally assumed antiquity of San Agustín in some doubt.

Near Barranquila, at Tubara, Sr. Carlos Angulo has conducted excavations. Ceramics and stonework from this site indicate connections with nearby Santa Marta and Tairona.

Peru. Dr. Paul Kosok, of Long Island University, is completing a survey of irrigation systems on the north Peruvian coast. This study of prehistoric irrigation and farming was begun by Kosok in 1941.

Mr. Richard Schaedel, Director of the Anthropological Institute at the University of La Libertad, Trujillo, has been continuing archaeological survey in the valley of

Lambayeque and also directing student excavations at a small ruin near Chanchan.

Argentina. Mr. Alberto Rex Gonzalez, former graduate student in anthropology and archaeology at Columbia University, has returned to Argentina and joined the staff of the Museo de La Plata.

Panama. Dr. and Mrs. M. W. Stirling have been on an archaeological reconnaissance and excavation program since early January in the Republic of Panama. This is the second season of the Smithsonian Institution-National Geographic archaeological survey of that country. Stirling reports an initial survey into the relatively unexplored Atlantic coastal region between Colón and the mouth of the Río Salud. He remarks upon the lack of archaeological sites along this coast, but states that there are sites well up all of the principal rivers, particularly the Río de Los Indios. A stretch on the Pacific Coast, below the Canal Zone, was also investigated. This survey went as far as the Río Chepo. Most of the sites in this region seem to be a good distance back from the coast on the major rivers. Two sites were excavated on the Río Utive, a tributary of the Río Pacora. Both of these sites were at the base of the mountains just beyond canoe navigation. Near these sites were a number of curious rock-walled terraces. In some cases, according to Stirling, these terraces could have been irrigated; in other instances they were situated too high up the hill slopes. The terraces are something of a puzzle in this country of abundant rainfall.

A number of rock piles on these terraces were excavated, but contained nothing either within or below the tumuli. Possibly, they were no more than rock heaps resulting from clearing the land of stones. Potsherds were plentiful on the terraces, and a considerable deposit of pottery sherds was recovered from a small earth mound (house mound?). The pottery styles, both polychrome and monochrome, are unlike anything previously recorded from Panama, although Stirling notes certain resemblances to Coclé.

Following the work south of the Canal Zone, Stirling made an excavation at the Barriles site in the Chiriquí area. To quote from his letter: "The pottery [from Barriles] is almost entirely unlike classic Chiriquí ware. . . . One of the most common types is rather fine ware in the form of open bowls with orange painted exterior and finely incised geometric patterns, but with the interior surface decorated with lost color. We have found no example of lost color painting on exteriors. Tripod legs are common, usually in effigy form, both human and animal, but unlike Chiriquí legs. There is also plenty of heavy incised ware with orange or red painting between the incisions. . . . We found one large urn with two lugs looking somewhat like pig snouts and four circular simplified raised faces around the shoulder of the urn. It had a heavy outflaring rim. The rim and the interior were painted red. Another freak at Barriles is a ware with a bright lemon yellow paint. We found . . . a number of fragments of the typical stone statues and four metates . . . all of the three-legged variety. There is no polychrome ware at the site. We found one half-vessel of the typical tripod Nicoya modified cylindrical jar, but unpainted and with an incised band around the rim. My impression is that the site represents the southernmost thrust of some Costa Rican culture that has but faint relationships with Chiriquí."[4]

Institute of Andean Research. The 1948 Annual Meeting of the Institute of Andean Research was held at the Viking Fund headquarters in New York on Friday, December 17 at 4:00 P.M. Those present were Drs. A. V. Kidder, Chairman; W. D. Strong; W. C. Bennett; G. F. Ekholm, Secretary; H. Tschopik; J. B. Bird; A. L. Kroeber; and Alfred Kidder II.

Routine business considerations, including the Palenque Project and the exportation of specified archaeological collections, were discussed. Dr. J. A. Mason was elected a member of the Institute. The present officers of the Institute as of the year 1948 were unanimously re-elected and the several existing committees were left as they were. (*G.R.W.*)

C^{14} DATES

The committee of anthropologists and geologists collaborating with Dr. W. F. Libby of the University of Chicago in dating specimens by means of C^{14} has requested ten individuals to collect material for this purpose: Early Man, F. H. H. Roberts, Jr.; Peru, Junius Bird; the Mankato moraine, R. F. Flint; Valley of Mexico, Helmut De Terra; Mesopotamia, R. Braidwood; Scandinavia and western Europe, Hallam L. Movius; Yukon-Alaska, Frederick Johnson; California-Oregon, R. Heizer; Adena-Hopewellian, J. B. Griffin; Southeastern United States, W. S. Webb. It is expected that these individuals will collaborate with Dr. Libby in a publication or publications which will interpret the cultural significance of the C^{14} dates. (*J.B.G.*)

AMERICAN ANTHROPOLOGICAL ASSOCIATION MEETING

The Forty-seventh Annual Meeting of the American Anthropological Association and affiliated organizations will be held in New York City at the Hotel New Yorker, November 17 to 20, 1949. At present the following symposia are planned: Old World Archaeology under the direction of H. L. Movius; American Indian Physical Types under the direction of T. D. Stewart and M. T. Newman; and the relationship of the various social sciences to anthropology led by B. W. Aginsky. The program chairman is James B. Griffin, Museum of Anthropology, University of Michigan. Individuals who desire to present papers are requested to submit titles, a 100 to 150 word abstract, and information as to whether projection equipment is needed. Due to the early date of the meetings it will be necessary to have titles submitted by September 15 to the program chairman. Room reservations must be made individually. (*J.B.G.*)

ARCHAEOLOGICAL FIELD SCHOOLS

The following institutions are conducting archaeological field schools this summer: University of New Mexico, University of Wisconsin, University of Oregon, University of Washington, University of Georgia, University of Michigan, University of Chicago, University of Oklahoma, University of Texas, Adams State College of Colorado, University of Colorado, University of Florida, University of Missouri. (*J.B.G.*)

[4] For work further north, in Costa Rica, see above, p. 78. *Editor.*

SOME RECENT PUBLICATIONS

The following abbreviations appear in the list which follows:

AA	*American Anthropologist*, n. s. Menasha.
AcAm	*Acta Americana*. Los Angeles.
AE	*Archives Ethnos*. Buenos Aires.
APS-P	*American Philosophical Society, Proceedings*. Philadelphia.
APS-T	*American Philosophical Society, Transactions*, n. s. Philadelphia.
APS-Y	*American Philosophical Society, Yearbook*. Philadelphia.
Ar	*Archeology*. Cambridge, Massachusetts.
ASC-B	*Archeological Society of Connecticut, Bulletin*. New Haven.
ASC-NL	*Archaeological Society of Connecticut, News-Letter*. New Haven.
ASNJ-B	*Archeological Society of New Jersey, Bulletin*. Trenton.
ASNJ-NL	*Archeological Society of New Jersey, News-Letter*. Trenton.
BA	*Boletín de Arqueología*. Bogotá.
BAE-B	*Bureau of American Ethnology, Bulletin*. Washington.
CAS-R	*California Archaeological Survey, Reports*. Berkeley.
CIW-CAAH	*Carnegie Institution of Washington, Contributions to American Anthropology and History*. Washington.
CIW-NMAAE	*Carnegie Institution of Washington, Division of Historical Research, Notes on Middle American Archaeology and Ethnology*. Washington.
CIW-P	*Carnegie Institution of Washington, Publications*. Washington.
CIW-YB	*Carnegie Institution of Washington, Year Book*. Washington.
CNHM-B	*Chicago Natural History Museum, Bulletin*. Chicago.
CS	*Ciba Symposium*.
EMA	*El México Antiguo*. Mexico.
EP	*El Palacio*. Santa Fe.
ESAF-B	*Eastern States Archeological Federation, Bulletin*. Harrisburg.
ESAF-RP	*Eastern States Archeological Federation, Research Publications*. New Haven.
FAS-NL	*Florida Anthropological Society, Newsletter*. Gainesville.
FIA	*Florida Anthropologist*. Gainesville.
GR	*Geographical Review*. New York.
HM	*Honduras Maya*. Tegucigalpa.
ISAS-J	*Illinois State Archaeological Society, Journal*. Champlain.
Mas	*The Masterkey*. Los Angeles.
MAS-B	*Massachusetts Archaeological Society, Bulletin*. Andover.
MAS-NL	*Massachusetts Archaeological Society, News-Letter*. Andover.
MASAL-P	*Michigan Academy of Science, Arts, and Letters, Papers*. Ann Arbor.
MHNC-R	*Museo de Historia Natural de Chile, Revista*. Santiago.
MiA	*The Minnesota Archaeologist*. Minneapolis.
MoA	*The Missouri Archaeologist*. Columbia.
P	*Plateau*. Flagstaff.
PA	*Pennsylvania Archaeologist*. Philadelphia.
PAC-NL	*Plains Archaeological Conference, News Letter* Lincoln.
RAE	*Revista de Arqueología y Etnología*, segunda epoca. Habana.
RMNL	*Revista del Museo Nacional*. Lima.
SAA-M	*Society for American Archaeology, Memoir*. Menasha.
SAP-J	*Société des Américanistes de Paris, Journal*, n.s. Paris.
SJA	*Southwestern Journal of Anthropology*. Albuquerque.
SL	*Southwestern Lore*. Gunnison, Col.
TA	*Tennessee Archaeologist*. Knoxville.
TAPS-B	*Texas Archeological and Paleontological Society, Bulletin*. Abilene, Lubbock.
TI	*Tlalocan*. Mexico.
TRB	*Tree-Ring Bulletin*. Tucson.
UC-PAAE	*University of California Publications in American Archaeology and Ethnology*. Berkeley and Los Angeles.
UWO-BM	*The University of Western Ontario, Bulletin of the Museums*. London, Ont.
WA	*The Wisconsin Archeologist*, n. s. Milwaukee.
YUPA	*Yale University Publications in Anthropology*. New Haven.

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